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VIEWS, NEWS AND INTERVIEWS.

A German authority reports the value of dynamos exported from Germany to Japan in 1892 as 73,741 yen, which far exceeded that from Great Britian or the United States; in 1894, however, those imported from Germany amounted to 18,120 yen, from England 49,222 yen, and those from the United States 145,200 yen.

It has been decided to construct a local electric railway, about 60 kilometres long, between Besançon and Levier, France. The line will be on the overhead trolley system, and have a gauge of one metre.

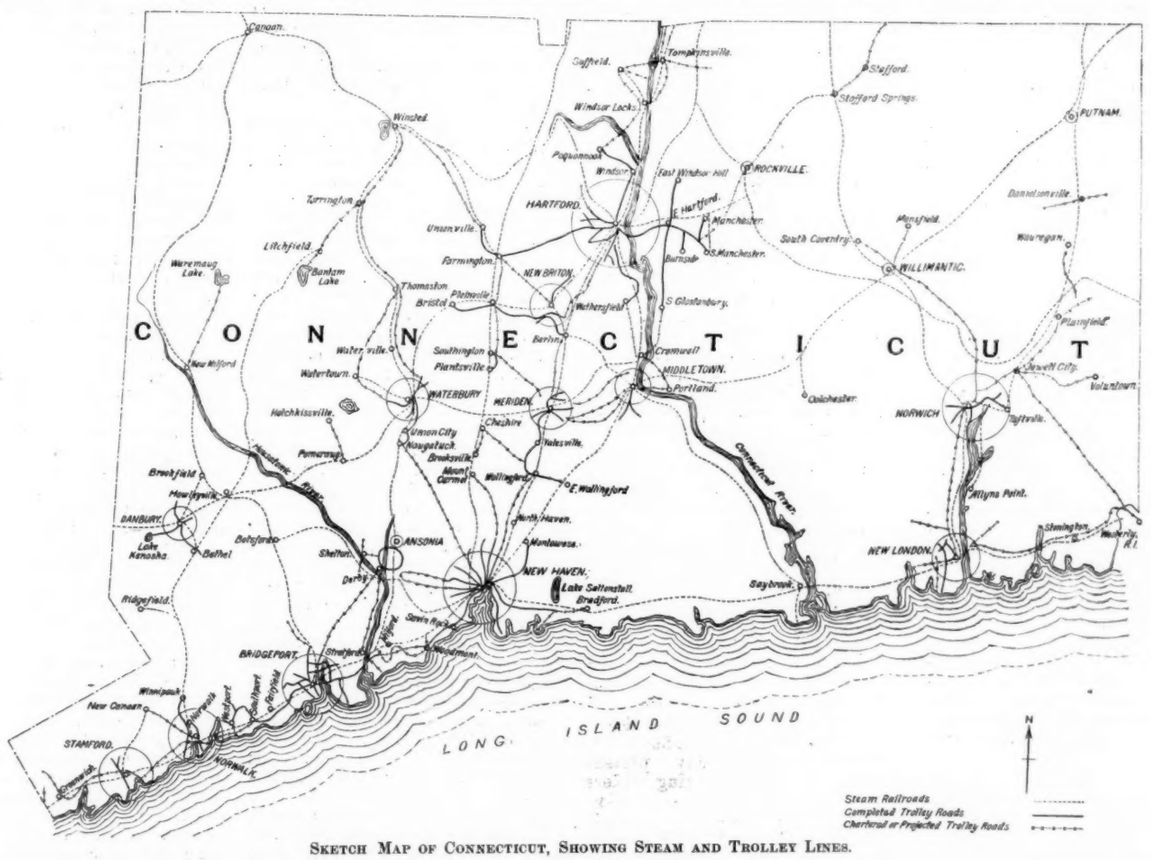
North Carolina has a mica output of 100,000 pounds a year, which is nearly four times as great as that of New Hampshire. South Dakota produces 18,000 pounds and New Mexico 1,000. The product of North Carolina is reported by the United States Geological Survey to be of the very best quality, and demands the highest price in the markets.

Mr. George Kissam, who has succeeded to the immense street car advertising business formerly carried on by Carleton & Kissam, believes in taking his own medicine. He is a large advertiser and some of his ads. are interesting enough to attract the attention of any reader, whether he is interested in street car advertising or not. One of Mr. Kissam's recent efforts in this line starts off as follows: "Sing Sing does not have very pleasant memories for some people, but it has a very fine system of electric cars traversing its principal streets and avenues. The advertising privileges are controlled by George Kissam, etc."

STEAM AND TROLLEY IN CONNECTICUT.

BY CLARENCE DEMING IN THE "RAILROAD GAZETTE."

The statistics of steam railroads in Connecticut, which have a total single trackage of 2,583 miles, bring out the suggestive fact that, apart from additional trackage of old lines and new sidings, less than 75 miles of new track have been laid in the State since 1885. In other words, 20 years ago steam railroad enterprise in the State had, in effect, exhausted itself



SKETCH MAP OF CONNECTICUT, SHOWING STEAM AND TROLLEY LINES.

NOTE.—Connecticut has an area of 5,001 square miles. Population by last census, 746,258, now about 820,000. Its surface is rolling for a distance from the coast of about ten miles inland, hilly in the central regions, rising to higher hills in the northeast and small mountains in the northwest. Its completed trolley roads have a single trackage of almost 300 miles, and the roads "chartered or projected," of which comparatively few are likely to be built, reach not less than 500 miles more, not including those projected in cities. The stock issued on completed trolley roads is about $9,000,000, of which a very large part has never been paid in as cash; the bonded debt is about $7,000,000; the floating debt can only be guessed at.

On the map the region around the cities is presented on an enlarged scale, necessarily distorting the distances in the neighborhood, but depicting somewhat the trolley systems within city limits. In Connecticut all the steam railroads are now owned or controlled by the New York, New Haven & Hartford Railroad Company except the New London Northern, running on the map from New London to the northern State line by way of Norwich and Willimantic; the Philadelphia, Reading and New England running northwestward from Hartford to the State line by way of Winsted and Canaan; and the South Manchester branch line. The New Haven Company's lines alone bisect about 130 out of 168 townships in the State, suggesting its power over the legislature.

territorially, and population was left to expand along a system of railroads most of them already old. This fact is a forceful one to explain the remarkable centralities of population in a State where about half the people, out of a total of some 820,000, dwell along the main stem of the New York, New Haven & Hartford (the "Consolidated") Railroad between Hartford and Greenwich, both inclusive, while at the same time large areas are void of railroads and on the down grade both in population and prosperity. On the map three such areas can be seen in the eastern half of the State, each almost as large as some of the Connecticut counties. They and the groupings of the railroad lines themselves show how it has come to pass that 18 cities and the same number of borough towns, each touched by one or more railroads, have absorbed about 75 per cent of the population in a commonwealth containing 168 townships; and also how, in populations so condensed, electric rivalry with steam has found a most alluring field.

A special factor in the Consolidated railroad system which has tempted that electric rivalry has been a large ratio of the company's passenger business. In its earlier and partly during its later history freight business was relatively ignored and left to the Sound boat lines. Not many years have gone by since a president of the New Haven company expressed himself in scornful terms of the "dead" freight traffic in contrast with the freight which "handled itself;" and still fewer years have lapsed since at so important a business point as New Haven a placard at the company's freight shed was big lettered with the words, "No freight received after 4 o'clock P. M." Ten years ago the receipts of the company were from freight, $2,783,188; from passengers, $4,506,455. The end of the 10 years, which, with the immense growth of the system and the absorption of roads, many of them freight carriers, have more than quadrupled receipts, still show great ratios of passenger traffic, and, spite of the remarkable results of expanding the Harlem freight terminal, receipts from passengers last year were $13,583,294 as compared with $11,896,695 from freight. How such a huge traffic in passengers, much of it local, has attracted the syndicates and other electric road promotors, into the hope not merely of securing a large fraction of it, but of an ultimate and profitable "strike" against one of the most prosperous steam railroad corporations in the world, goes with the mere statement of the conditions.

A little more than five years ago the first clumsy experiments with the trolley began on two or three minor roads of the State. The new motors drew little attention save as curiosities, were essentially failures, and not until better trolley equipment of some of the old street railroads did they attract the languid notice of the steam companies. The latter, indeed, remained strangely passive toward the new motive power until the period of extending the old street railroads began, late in 1890, and then they woke up with a start. Since that time there has been, until lately, almost incessant conflict, modified somewhat by the political deadlock of the legislature of 1891, but waged bitterly in both legislatures since, as well as in the courts, and to some extent in the municipal governments.

In the legislature of 1893 the battle, on the whole, was a drawn one; the general street railroad law passed in that year, however, slightly favoring the trolley on streets. But the steam companies massed their forces in the legislature of 1895, crushed out scheme after scheme of the new trolley companies and secured a ruling in committee which applied to trolley companies owning their own roadbed, the sharp checks of the general steam railroad law passed 20 years ago. Should that ruling hereafter be held by the courts also, the trolley companies must hereafter confront the rising sentiment of the people against surrender of highways, on the one hand, and, on the other hand, a statute almost prohibitory on electric companies seeking their own roadways. The ruling appears to be technically correct, and accords with the letter of the law of 1893, which applies only to "street" railroads, the possibility of independent roadbeds not then being foreseen. But it is by no means impossible that the courts may reject so drastic an interpretation or the next legislature amend the law so as to expunge a technicality which is quite out of key with the real aim of the statute.

A law passed by the last Connecticut Legislature, absolutely prohibiting crossing at grade by steam and electric roads, was another reverse of trolley enterprise which checks extension and at a number of points in the State severs electric systems so that passengers must pass the gaps on foot.

That and other legislative defeats, together with a decision of the courts against a parallel scheme, have almost blocked for awhile trolley expansion in the State and at the present time hardly a single electric road is building. But the expansion during 1893, 1894 and the earlier months of the present year was enormous, chiefly under charters much too liberal, obtained from the legislature of 1893. The figures during that brief period of about two years and a half show an increase of about 100 per cent in single track mileage of street railroads (all of them now trolleys), swift consolidation of both old and new street railroad properties, a paralleling of steam roads—by old and new street companies combined—of about 91 miles and many plans for extension. There has also been, in general, a remarkable growth of trolley business, the increase of Summer excursion traffic and of the use of the trolleys for recreation being especially marked. A Connecticut phrase, "the trolleys pick up passengers under the bushes," is more than metaphor.

Losses by trolley competition on the New England and Connecticut steam lines other than the Consolidated have not been published. But at a legislative committee hearing several months ago the officers of the Consolidated company presented statistics of loss during different fractions of a year on the 55 miles of their system paralleled by Connecticut trolleys. The figures were offered first in the deceptive form of percentages, then in the scarcely less misleading shape of "number of passengers"—conveying thus an exaggerated idea of loss as the passengers were carried very short distances. With the ratios carried out for a whole year and the totals reduced to money, the trifling loss appeared of but $32,461. This in itself was not alarming, and an increase from 1894 to 1895 on the whole Consolidated system of passenger mileage from 725,250,169 to 747,008,728, with no important extension of the steam company's lines, goes also to prove that trolley competition has been far from deadly. Still it contains elements to give the powerful corporation grave concern. Notwithstanding the increase of passenger mileage there was a decrease of passengers for 1895 as compared with 1894, from 44,448,324 to 43,828,676, the average distance carried rising from 16.32 miles to 17.04 miles—both, undoubtedly, the effect of the competitive trolley. Moreover, while a considerable loss has been caused by the trolley equipment of old parallel lines, it has had small ratio to the loss where new trolley parallels have been constructed, these, in a number of cases, sweeping away from three-quarters to almost nine-tenths of the local steam passenger traffic between the competing points. In this was an alarming hint of the potential consequences of new trolley parallels, however plausibly it might be urged that new trolley lines as laterals might offset the loss, and that the trolleys would, as a rule, affect seriously proximate rather than intermediate stations. A new motive power which, even at a few new points of competition, could all but destroy local passenger traffic on the steam road, was a thing to be feared as a speculative mystery, if nothing else.

Partly as a result of that apprehension, partly in consequence of the success of the Nantasket Beach experiment, the Consolidated managers have now disclosed a new plan of campaign, supplementing their tactics in legislatures and courts. A physical policy has for the time superseded the work of lobbyist and attorney. It can be best set forth by a sketch of the railroad strategy, which has for its base of operations the city of Meriden.

That city, situated not far from the geographical center of the State, has a present population of about 28,500, and a trolley system some 17 miles long in single trackage, reaching southward to Wallingford, and closely paralleling the main stem of the Consolidated company. Meriden is about 18 miles away, in opposite direction from New Haven, with a population of about 100,000, and Hartford with a population of about 62,000. Within a maximum radius of about 12 miles are Wallingford, with a population of 7,000; New Britain, with a population of about 22,000 and a trolley line reaching already to Berlin, only eight miles north of Meriden; Southington, with a population of 5,500 and a short trolley road; Waterbury, with 38,000 people and a trolley system with 12 miles single trackage, and Middletown, with a population of about 17,000 and a small trolley system—in all a population of about 118,000 within the stated radius, not counting several minor places or New Haven and Hartford. Meriden is also near the midway point of the Waterbury, Meriden & Cromwell steam road, formerly leased to the New England, but which the receivers of the latter company decided to let drop. It is now well nigh certain that the Consolidated company has not only bought up a block of bonds which by foreclosure will control the Waterbury, Meriden & Cromwell line, but has also purchased the trolley system of Meriden. It means almost beyond question, in the near future the operation of the acquired steam road by electricity in conjunction with the Meriden trolley system, the plan requiring but a single power house at Meriden and another at Waterbury. How effectively the step breaks any electric parallel scheme on the important section of the Consolidated system which lies between New Haven and Hartford, a glance at the map will demonstrate.

The Meriden plan of the Consolidated company joined with its recent purchase of the Stamford street railroad system—also with the New Canaan branch to be operated in conjunction—outlines with considerable clearness the policy of the great steam corporation. That policy may be forecast briefly as the acquisition of any trolley roads where the purchase will break threatened extensive parallels, and at the same time allow economies by uniting in operation by a single power-house branch lines equipped electrically together with the trolley system bought up. Obviously one of the next salient points in the State is Waterbury, where the threatened parallel in the Naugatuck Valley with its long series of busting factory towns can be severed and the Watertown branch operated also by electricity. The New Britain & Middletown branches, the Rockville branch of the New England, the branches to South Manchester—a *quasi*-private line—the Suffield branch and others will suggest themselves as open to the same policy. Larger developments, such as applications of electricity to the main stem or the proposed electrical equipment of two of the four tracks to enter Boston so as to make a suburban trolley service, are more speculative and exceed the scope of this article. Suffice it to say that one of the leading officers of the Consolidated company goes so far as to predict the time not very far away when practically the whole electric system of the State in cities will be acquired by his company and utilized not merely in the passenger service, but the freight service also—the latter already gravely complicated in the larger cities by lack of room and its high cost, original and in interest, while loaded cars await delivery.

As fighting ground of steam and trolley during two sharp campaigns and others, doubtless, to come after the present armistice, Connecticut offers a suggestive field for speculative queries, among them these: Will the Consolidated company, now a completed and proclaimed monopoly, be able to retain its old dominance in Connecticut legislation? Will the trolley companies, under a modified general law and owning their roadways, with large latitude for speed, be able to force upon the steam monopoly far graver problems than any which have yet beset it? Will the policy of purchase of trolleys by the steam corporation be restricted or extended, and will or will it not invite new trolley enterprise with a "strike" as its ultimate effect? And will the trolleys, as laterals and feeders, ultimately offset or not their more immediate effects as parallels and competitors?

This last query may in part be answered here. Experience in the case of the Consolidated has shown that to some degree the competing trolley parallels feed some passengers to the steam road going to stations beyond the trolley terminals and that the number of those passengers tends to increase. A person living midway between stations A and B of the steam road as competing points obtains new facilities for travel to remoter points; and such a passenger does not appear in any statistics of loss between the two stations. As laterals to the steam road the trolleys have already proved to be somewhat the same as an actual increase of population in its relation to passenger traffic. But whether these two offsets will make good the direct and immediate loss by trolley competition, time only will disolose.

The trolley companies of the State also have their threatening obstacles ahead in the growing tendency toward local taxation, a waxing sentiment against their occupancy of rural high-

ways and a possibility by no means remote that they may be forced to put their wires underground. But all these future perils of the Connecticut trolley are minor as compared with its danger from rulings of the State courts on the question of added servitude upon the highway and the consequential right of the abutting land owner to damages.

This subject deserves its brief review. In Connecticut, as in many States, it is still a case in transition. There happen to be two, and only two, decisions of the State courts bearing directly on the subject and opposed to each other in temper and ruling. The first is that in the case of Imlay *vs.* The Union Branch Railroad Company (26 Conn., 249), in which a steam company sought occupation of a Hartford city street. The suit, 38 years ago, was an amicable one, and the Supreme Court judges all concurred in the decision which was written by Chief Justice Storrs, one of the brightest lights of the Connecticut bench. The tribunal found against the company, a fact of less import than the principles laid down in the finding. The judge held that there was no identity between railroad and highway; that the contrary view would lead to the conclusion that a broad street might be partly made into a canal if only passing way were left for pedestrians and vehicles; that the latter construction would also imply that a railroad could continue, without paying damages, to occupy the highway after it had been discontinued as such; that the fundamental principle to guide in the case was that the user of the highway should leave it unobstructed and in the same condition after passage as before. On these grounds, and others not bearing so closely on later aspects of the question, the court declared that the railroad constituted an additional servitude, entitling the abutting land owner to compensation for damages.

Eight years later, in 1865, came the individual decision of Judge Ellsworth, of the Supreme Court, in Elliot *vs.* Fair Haven & Westville Railroad Company (32 Conn., 579), the judge presiding in the Superior Court, a lower tribunal. He held sweepingly in direct contravention of Storrs and his colleagues that the existing servitude embraced "all public travel not prohibited by law, on foot, carriages, omnibuses, stages, sleighs and other vehicles as the wants and habits of the public demand," and that the absolute power to regulate such traffic vested in the legislature. He found, therefore, that the use of the highway for horse cars —which he classed as a kind of omnibus on rails—created no new servitude, but was a part of the public use to which the land was subjected when originally taken as a highway. His opinion, while far less copious in citation of authorities than that of Judge Storrs, and treating with much less fullness and force the principles involved, has become the rule of law in determining the status of horse railroads. But in Connecticut it leaves the question of the trolley, with its overhead structure, its increased speed, larger cars and greater obstruction of the highways still pending, though a matter which the Connecticut Supreme Court, after approaching the subject already in two or three cases, must soon pass upon. In the words of the last report of the Connecticut Railroad Commission: "The final decision will depend on whether the courts follow and accept the reasoning of Chief Justice Storrs in the one case or of Judge Ellsworth in the other." The first of these decisions was rendered in 1857, the second in 1865, and both judges have been long dead. It will be a curious outcome if the decision of the momentous question fixes the added servitude after the Consolidated company acquires many electric lines, and thus is compelled to assume double servitude.

Not all the problems forced on the people of Connecticut pertain to the carrying trade and its rivalries, to finance, to economics and to State legislation. There are not a few political and civic ones expressed in terms of corruption of municipal bodies, and accented at the present time by an investigation in Bridgeport, where a committee of inquiry, seeking light on the charge that the local trolley company has violated specifications, is thwarted by the plea that past city officers have in form of law accepted work both illegal and bad.

Not entirely illogical is the phrase of a prominent citizen of the State, who, announcing his conversion to city ownership of trolleys, declares it merely a question of "city ownership of trolleys or trolley ownership of cities." Peculiarly interesting, too, is the query what readjustment of population the trolleys are to bring in a State where the drift of rural population to cities has been so singularly marked, where the farm life has decayed and the old yeoman spirit has died out. Will the trolley repopulate the farms by making them more accessible, or will they depopulate them still more by bringing the allurements of the city nearer? Will they ruralize the city or urbanize the country with all the social, civic and moral recastings which those processes suggest and imply? These are large subjects on which many words may be penned, but not here.

Bold Robbers Try to Steal an Electric Car.

A new and daring exploit in robbery has been attempted in Cincinnati, says a daily contemporary. The motorman and the conductor of an electric car, which had reached the end of the line, went into a waiting-room to get warm. They heard a sudden noise, and, looking out, they saw the car spinning down the track in charge of two men. Boarding another car, which came along at that moment, the motorman of the stolen car followed in chase. Although the men handling the car in front rushed it along at a speed of 20 miles an hour, the pursuing car gained upon them. As the city was approached the men weakened, slowed up, and, jumping from the car, escaped. It is believed that the thieves expected to get away with the car, and on the way to town collect passenger fares.

The Passing of the Cable Railway System.

The three big plants that operated the cable system of the Philadelphia Traction Company are rapidly being dismantled, and the buildings that they occupied will probably be utilized for manufacturing purposes before many months. A brick-making company has bought the engines.

One of the Russian torpedo boats is named "Vzryv." To pronounce it, says the *American Engineer*, you inhale red pepper and stand on your head.

October Weather Decreases the Use of Electric Light.

The earnings of the Edison Electric Illuminating Company of New York for October, including the Manhattan and Harlem companies, were as follows:

October.	1895.	1894.	Decrease.
Gross.....	$148,219.02	$148,555.43	$336.41
Net.....	62,716.84	68,625.83	5,909.49
			Increase.
Gross, 10 mos	$1,469,376.79	$1,320,440.17	$148,936.62
Net, 10 months.	708,433.88	623,94.647	84,486.24

These figures adduce an interesting fact, one to which all central stations can trace more or less loss at certain seasons. The incandescent returns, per 16 candle power lamp installed, are 20 per cent less than in October, '94, chiefly due to the exceptional weather of October, '95. During that month there were 628 clear hours, October, '94, having but 437. The incandescent returns show $8,661 less than in October, '94.

OBITUARY.

Colonel Albert W. Johnson, of Fort Hamilton, Long Island, father of ex-Congressman Tom L. Johnson, the iron manufacturer and electric railway magnate, died at the latter's home in Cleveland, Ohio, on November 6, from cancer.

Samuel E. Levis, manager of the Direct Cable Company, 40 Broadway, New York, was found dead in bed in his boarding house, 356 Clinton street, Brooklyn, shortly after eight o'clock A. M. on November 13. A gas jet, which supplied a small stove in the room, was turned on. The case is looked upon by the friends of the dead man, and the police as well, as one of accident and not suicide. Mr. Levis had been connected with the Cable company for a number of years and was the only support of a widowed mother in Halifax, N. S.

Another Fatal Flywheel Accident.

A gigantic flywheel burst in the power house of the Albany, N. Y., Railway Company on November 12. Four persons were injured, one of them mortally, in a saloon opposite the power house. One piece of the wheel tore out the whole front of the saloon and another the whole upper portion of the house. Nobody in the power house was hurt. A house two blocks away was wrecked by a flying piece of the wheel, eight feet long and four feet wide. A section of the north side of the power house, 25 feet wide, and extending from the ground to the roof, was torn out, and one of the engines and a generator were demolished. The damages amount to $30,000.

Some interesting figures have been collected on the changes brought about by the substitution of electricity for horse-power. It is stated that if the street-car service now in operation in Chicago were effected by horses, as formerly, it would require 30,000 horses, 3,000 stablemen to take care of them, 1,500 blacksmiths to shoe them and 5,460,000 bushels of oats and 1,000,000 tons of hay to feed them annually.

Those Predictions About General Electric.

[*From the Boston News Bureau.*]

The statement of the ELECTRICAL REVIEW is not confirmed by General Electric interests either in Boston or New York. It is said that the Morgan interests have been studying General Electric affairs for some time and it is also known that Mr. Morgan has retained his interest in General Electric stock.

There is a good deal of talk by stockholders over the failure of the General Electric Company to come to some arrangement with Westinghouse as regards patent litigation (it is figured that the cost of patent litigation equals a dividend of one per cent on both General Electric and Westinghouse shares), but it is not known that there is anything new in the situation.

[*From the New York Herald.*]

Mr. J. Pierpont Morgan said that there was no truth in the story that he would assume control of the General Electric Company or that he would take any part in its management. The reported resignation of President C. A. Coffin could not be confirmed, although it was believed in Wall street that it might occur at an early date because of the differences of opinion that have existed for some time in regard to the management of the property. The renewed talk about an alliance with the Westinghouse Electric Company was regarded as pure fiction.

[*From the Boston Advertiser.*]

The retirement of President Coffin from the General Electric Company, which is now definitely settled as to take place January 1, will further the negotiations between the Westinghouse and General Electric toward the disposal of useless suits in the court. It may mean more or less, according to the extent of the agreement made. It is stated that Mr. Morgan will personally represent the interests of the General Electric when a meeting between the representatives of the two companies is arranged.

[*From the New York Evening Post.*]

The advance in General Electric was about equally due to covering of shorts and to buying by traders on published statements that the president of the company had resigned and will be succeeded by a direct representative of J. P. Morgan & Company.

PRESIDENT COFFIN'S RETIREMENT.

It is reported from Boston that a leading director of the General Electric Company says he is not cognizant of any plan that could possibly give basis for the current reports of the retirement of President Coffin.

The construction of the telephone line from Granville to Westfield, Mass., is being pushed and in a short time Granville will be connected with the long-distance telephone system.

LITERARY.

Scribner's announce that their Christmas number, to be ready November 25, will contain 70 illustrations, 12 of them in color, printed in a very original way across the text of a fantastic story by Brander Matthews.

The London *Electrician*, Salsibury Court, Fleet street, London, E. C., announces that the 14th edition of its electrical trades directory and handbook for 1896 will be ready in January. It promises to be larger and better than ever and to live up to its reputation as a really reliable directory.

"Giving and Getting Credit," by Frederick B. Goddard. 12 mo., cloth, 217 pp., price, $1. The Baker & Taylor Company, New York.

This is a book for business men, which contains many bits of good advice on the subject indicated by the title. The references are especially interesting, and the author often illustrates a proposition with an apt simile which gives it added force. Electrical business men will be interested to read that one wholesale tobacco house does a large business at an annual expense of two per cent, and a dry goods jobbing house doing a yearly business of $40,000,000 pays out but five and one-half per cent in expenses. The book is well worth the time required for a careful perusal.

A complete and immediate revolution of transportation methods, involving a reduction of freight charges on grain from the West to New York of from 50 to 60 per cent, is what is predicted in the November *Cosmopolitan*. The plan proposes using light and inexpensive corrugated iron cylinders, hung on a slight rail supported on poles from a cross-arm—the whole system involving an expense of not more than $1,500 a mile for construction. The rolling stock is equally simple and comparatively inexpensive. Continuous lines of cylinders, moving with no interval to speak of, would carry more grain in a day than a quadruple track railway. This would constitute a sort of grain-pipe line. The *Cosmopolitan* also points out the probable abolition of street cars before the coming horseless carriage, which can be operated by a boy on asphalt pavements at a total expense for labor, oil and interest of not more than one dollar a day.

"Polyphase Electric Currents," by Sylvanus P. Thompson. Cloth, illustrated; price, $3.50. Sent postage free on receipt of price by the ELECTRICAL REVIEW Publishing Company, 13 Park Row, New York.

This book contains about 250 pages. It is a clear and comprehensive compendium of all the important features of the rapidly developing art described in its title. It will be at once acceptable to the engineer and to the student. It is fully illustrated with excellent cuts, and the diagrams illustrating the descriptive text are particularly numerous and clear, enabling the reader to get at the viscera of the motor understandingly. In this respect it is a fit companion piece to the same author's exhaustive treatise on "Dynamo-Electric Machinery." There is just enough mathematics in the book to give the engineer what he needs without taking the edge off the appetite of the student. It contains a very interesting chapter on the early history of the polyphase motor. The motors of Bailey, 1879, the researches of Deprez in 1880, and the pioneer work of Ferraris, 1885, and Borel, Coerper and Bradley in 1887, are given their due position in the literature of the art. The Frankfort-Lauffen installation and the Niagara plant are fully considered. The main part of the book is given up to a philosophical consideration and analysis of the principles involved in a polyphase motor. The interesting type of induction motor, called by the author monophase motor, is given a chapter to itself. The polyphase transformer forms the subject of another chapter, under which the important subject of phase modification is treated. Far too little space is given this important subject. No mention is made of the patents of Fred S. Hunting for converting two phases into three or *vice-versa*, although the author describes as one of the earliest plans a plan of his own which was anticipated at least two years by Hunting and also by Bradley, as may be seen from patents 514,933, filed July 14, 1893; 535,010, filed February 25, 1892, and 492,480, filed March 17, 1892. As these patents were noticed in the ELECTRICAL REVIEW at the time of their issue, there is no good excuse for the oversight. A reference list of the bibliography of the art is added in an appendix which will prove of value to those who want to follow the original sources of information.

Daddy-Longlegs and the Welsbach Light.

[*From London Lightning.*]

During the past Summer we, in the northern suburb where I live, have been suffering from a plague of daddy-longlegs, which persistently seek self-destruction in any lamps or candles they may come across. A friend who has had the incandescent gas put into his house—we are not yet within reach of any electric supply—tells me that the impact of these suicidal insects as they fell into the lamp-chimney proved sufficient to break the delicate mantle on which the light depends. None the less he is pleased with his bargain, says that a mantle—more or less broken—lasts a year, and that the light is less greenish after a few months' use than at first. This is contrary to what I have heard elsewhere; but certainly his lamp was tolerably free from the objectionable green glare. The Welsbach system may yet do us a good turn; by accustoming people to a better light it educates them up to demanding the best.

THE PROFESSOR'S EYE.

BY W. L. ALDEN IN THE NEW YORK "SUN."

There is one thing that troubled Professor Van Wagener. He had his electric light rigged up in the top of his hat, as I believe I told you. This was all right when he took his walks abroad, but it wasn't quite so convenient in the house. Every time the professor wanted a light he had either to call the maid, or his daughter, or his wife, or else he had to put on his hat. Now he had a fashion of reading in bed, and he found it mighty awkward to go to bed with his hat on, which was what he had to do if he wanted a light to read by. One day a thought struck him, and he told his wife that he had solved the problem of his headlight at last.

A glass eye isn't of very much use, except for show, and this was a reflection that had always annoyed the professor, ever since he began to wear a glass eye. He now saw his way to make that eye useful and to give himself the most convenient light that a man ever had. His idea was to make a glass eye with an incandescent fiber in the middle of it, and to run it by a storage battery in his waistcoat pocket. So he went to work, and, being a very ingenious workman, as well as a man brimful of science, he turned out a glass eye that couldn't be distinguished from a natural one, so far as appearance went, and that had an electric light of six candle-power in the middle of it.

It was the biggest success that the professor had ever had. Wherever he went after dark that eye was blazing away and lighting up the path. When he wanted to read there was his light in just the handiest place it could possibly have been. The fine wires that ran from it down to his waistcoat pocket were concealed under his hair, so that hardly anybody would notice them; and when he wanted to put his light out, or to turn it on, all he had to do was to put his finger and thumb into his pocket. Then, again, the thing operated like a dark lantern, for whenever the professor wanted to turn his light off in a hurry, and without fumbling for the button in his pocket, all he had to do was to shut his eye. The light would keep on burning behind the eyelid, but it wouldn't be bright enough to attract attention.

The day the professor got his new eyelight into working order his wife wasn't at home, having gone out to spend the day and the evening. He lit himself up early in the evening, and, keeping in his room, he wasn't seen by anybody. When night came on he went to bed early, so as to enjoy the luxury of reading in bed. He took the storage battery out of his pocket and put it under his pillow; and when he had stretched himself out in bed, with a book in his hand and his eye blazing away with six candle-power, he was about the happiest man in all New Berlinopolisville. He read and read until he began to get sleepy, and then he put down his book and thought over a lot of scientific things, till he accidentally fell asleep. I told you he could close the lid over the illuminated eye, if he wanted to, but as a rule he didn't close that lid, but slept with it open. Mrs. Van Wagener came home in the course of time and naturally went to her bed-room. She was a strong-minded woman, who was about as likely to steal a sheep as to faint away, but she admitted afterward that when she entered the room and saw the professor's eye blazing at its level best, she came nearer dropping on the floor than she had ever done before or since.

However, she pulled herself together and woke the professor up. She never said just how she did it, but it's my idea that he was waked up suddener than a man was ever waked before. She told him that this time he had gone too far; that his illuminated eye was simply blasphemous, and that she wouldn't stay in the same house, much less in the same room, with it. "It's bad enough for a man to sleep with a glass eye wide open," says she, "but when it comes to an illuminated eye, it is more than any Christian woman is called to bear."

The professor was ordered to turn his eye out at once, which he naturally did, being a small as well as a peaceful man; and he was told that he must never wear an illuminated eye again. This didn't suit him, for he was proud of his new eye, and then there was no denying that it was a very convenient thing. So he said that he really couldn't afford to give up one of the most important inventions of the age just because of a woman's whim, and he stuck to this view of the case all through the night. The next morning Mrs. Van Wagener went home to her mother and brought a suit for divorce against the professor on the ground of cruel and inhuman treatment. When the case came on to be tried the professor was compelled to show the working of his illuminated eye to the jury, and they found a verdict for the plaintiff without leaving their seats.

The Passing of the Horse.

[*From the New York Sun.*]

The "passing of the horse" is a favorite phrase among people who consider the bicycle, the trolley and the horseless carriage. The horse will never pass so long as merit is appreciated or utility is money in the pocket. It seems to us that the horse, as seen at the Horse Show, is becoming more intellectual year after year, more amiable, daintier in step, finer in manners, friendlier in the eye, more foppish, or, indeed, if we may say it, sweller. Brains and beauty characterize many of the horses at Madison Square Garden. Prime animals they are, far more acceptable to the artistic taste than lots of human people. They show what comes from breeding, training, feeding, and having a good time.

The passing of the horse ahead of mankind!

THE STANDARD TELEPHONE COMPANY.

A Brief Account of Its History and the Promises It Hasn't Kept.

A COMMUNICATION FROM PRESIDENT BARNES THAT LEAVES A GOOD DEAL OF INFORMATION UNSUPPLIED — SEVERAL PERTINENT INQUIRIES THAT IT IS TO BE HOPED THE STANDARD WILL PROMPTLY AND SATISFACTORILY ANSWER.

The announcement of the organization of the Standard Telephone Company, of New York, was made several months ago, and simultaneously the organization of a number of sub-State companies was published. The capital of the parent Standard company was placed at the good round figure of $10,000,000 and various millions figured in the capitalization of the local companies. The list of directors, with a statement of what the company expected to accomplish, appeared in the ELECTRICAL REVIEW April 10 of this year. At that time the president of the company, Mr. Thurlow Weed Barnes, is reported as saying:

"We propose to commence our service this Summer in New York city with a rate of $3 a month for telephones. We have purposely kept the matter very quiet for nearly three years, until we had secured the franchises we wanted."

It was further announced in a Chicago dispatch in the same issue that the company expected to begin laying wires there "within two weeks" under a "cosmopolitan franchise" just granted, and the Chicago rate for telephones would be $25 per annum.

These rates, as every practical telephone man knows, were so much less than the cost of furnishing city service that much doubt was cast upon the scheme, and the ELECTRICAL REVIEW said at the time that "just how the company proposes to establish itself has not been divulged."

Still the men forming the board of directors of the Standard company were, in many instances, successful men of affairs, some of them of great wealth, and the public had confidence in them.

Inquiries made from time to time at the offices of the company in the Postal Building by representatives of this journal as to the telephone apparatus to be used, when the operation of any of the company's exchanges could be expected, etc., always brought the reply that the company was not ready yet to more definitely announce its plans. Meanwhile additional local companies were being organized with large capital, but nowhere can it be learned have exchanges been installed. Some of these companies have become impatient over the delay and, in a few instances—notably a New Jersey company, a Wisconsin company and a Southern company—have begun proceedings against the parent Standard company for its failure to provide telephone apparatus as promised.

If this company were organized to do a legitimate telephone business, it is now time for it to prove its standing; if it be an organization to enable some unscrupulous schemer to swindle the stockholders of subsidiary State companies by selling rights never possessed, it is time for this fact to become known to the public.

The reputable men—and there are several of them—named on the board of directors published below, should immediately investigate the affairs of this company, and if it be found to be, as every indication leads one to believe it is, a fraudulent concern a prompt exposé should follow.

The officials apparently active in the management of the Standard Telephone Company, with offices at its headquarters, are the president, Mr. Thurlow Weed Barnes, and the general manager, Mr. Allen T. Nye. The announced directory includes these officials and the following-named gentlemen:

United States Senator John P. Jones, of Nevada.
John A. Brill, of Philadelphia.
Carl F. Boker, New York.
John W. Candler, Boston.
George Crocker, San Francisco.
Henry Merz, New York.
M. C. Palmer, Syracuse, N. Y.
Felix Rakemann, Boston.
John E. Searles, New York.
Chas. T. Strauss, New York.
Louis Windmueller, New York.

Last Thursday the ELECTRICAL REVIEW sent the following letter to General Manager Allen T. Nye, of the Standard Telephone Company:

NEW YORK, November 14, 1895.

ALLEN T. NYE, Esq.,
General Manager Standard Telephone Company, 253 Broadway, City.

My Dear Sir:—Will you please let us know if your company has installed any telephone exchanges or is operating any systems in any part of the United States? We expect to have something to say concerning this matter in the ELECTRICAL REVIEW next week, and would like answers to above questions and any other information you are inclined to give us.

Very respectfully yours,
ELECTRICAL REVIEW,
Chas. W. Price, Editor.

On Saturday afternoon the following reply to the above was received from Mr. Thurlow Weed Barnes, president of the company:

THURLOW WEED BARNES, President; ALLEN T. NYE, General Manager; ENNIS H. SEARLES, Assistant General Manager.
STANDARD TELEPHONE COMPANY,
General Offices: 253 Broadway, Postal Telegraph Building.

NEW YORK, November 16, 1895.

CHARLES W. PRICE, Esq.,
Editor ELECTRICAL REVIEW.

Dear Sir:—Replying to your letter of 14th instant to Mr. Nye, I beg to say we have never gone into particulars as a company about our business, but your letter put me in a mood to answer *seriatim* every charge so far made against this company, and I wish you would print the enclosed. It is fresh reading matter and would be, I think, good news for your paper. If you use it, please send us 250 marked copies.

Yours respectfully,
THURLOW WEED BARNES, President.

The "fresh reading matter" inclosed by Mr. Barnes is published below *verbatim*:

THE STANDARD IS ALL RIGHT.

PLAIN STATEMENT AS TO THE SCOPE, PROSPECTS AND POSITION OF THE GREAT COMPETITIVE TELEPHONE CORPORATION.

ABSURDITY OF ANONYMOUS ATTACKS FULLY EXPOSED.

They say the Standard has no patents.

No responsible person will so assert, because the records of the United States Patent Office show to the contrary.

They say the Standard telephone is the same as the Bell.

The Standard owns three telephones; neither one of them is "the same as the Bell," and the best of them is far superior to the Bell.

They say the Standard has no exchange in operation.

The Standard has an exchange in operation, and has had one for some time, at Kingston, N. Y., with over 250 miles of wire. It has not been the policy of the company to establish small exchanges. Scores of such plants could have been established easily, but the company has been at work in another direction.

They say the Standard Telephone Company has no manufacturing facilities and cannot supply telephones.

The best way to find out about this is for any authorized, responsible person or subcompany to order Standard telephones in lots of not less than 50 All orders will be promptly and satisfactorily supplied.

They say the Standard has no switchboard.

The company refers to the written opinion of Myron Francis Hill, until lately examiner of patents in the United States Patent Office, who very summarily disposes of that canard. And speaking of the Standard switchboard patents, it may be interesting to quote Mr. Hill's exact language: "I believe them to include features that will do away with the complicated mass of wires and apparatus of existing exchanges, and thus revolutionize telephone exchange work in this country, giving much better and quicker long-distance and local telephone service at cheaper rates than have heretofore been possible." The Standard patents, Mr. Hill says, are "valid, fundamental and impregnable."

They say that the Standard directors are bad men.

The same sheet that originated this allegation has for months been bringing the same charge against the directors of the General Electric, who are among the most prominent and honored capitalists in this country.

They say the Standard telephone patents are valueless.

Marcellus Bailey, who drew the specifications for the original Bell telephone patent, says: "The Standard patents are as solid as the rocks of Gibraltar." George William Moore, of Detroit, Mich., a very able lawyer, and General James McNaught, of New York, the great corporation lawyer, express the same opinion; so do other authorities, professional, expert and practical.

They say the Standard telephone will not talk.

The Standard telephone has been tested hundreds of times, and it always "talks" for itself, over all distances to which it has been subjected and over lines poorly insulated, that parallel and cross electric railroads, electric light wires, and go through miles and miles of underground conduits. This is a demonstrated fact; and it will be demonstrated again at any time to the satisfaction of any person entitled to verification.

They say the Standard exists only "on paper."

All enterprises, great or small, when they begin so exist for a time. The Bell company once existed "only on paper." So did the Postal Telegraph and the Westinghouse Electric.

They say it is impossible to find out what the Standard is doing.

The Standard was temporarily defeated once because its plans were known; since then the rule is to say nothing.

They say that the Standard has been attacked and that no reply was made.

True. The Standard is engaged in the telephone business, not in newspaper controversies. The author of anti-Standard "reading matter" at Richmond, Va., after circulating it, skipped the town. No attention was paid to him; the Standard is not going into the mud slinging business.

A "wicked" circular, not dated, addressed to no one and unsigned, is said to have been issued by the Standard.

When asked if this were a fact, President Thurlow Weed Barnes, of the Standard company, telegraphed to Philadelphia: "I never authorized nor issued such a circular, nor did the Board of Directors do so." When the same question was asked of General Clarkson, another official in the Standard, he said: "We never issued it. * * * We have gone into a big fight and expect a hard struggle, and this is part of it." Director R. W. Hunt, of Chicago, said: "No business man would issue such a circular." Director R. A. Parker, of Memphis, Tenn., said: "The recent published attack upon the company did not, in any degree, weaken my confidence. * * * Your efforts deserve success, even if never attained."

They say that the Standard is an illegitimate company.

The telephone business is an honest business and a legitimate business; provided a new company possesses valuable patents, is conducted by men of position and honesty, and has the capital and the determination to enter the field, its effort will bring the price of telephones to such figures that telephonic connections will not be, in future, a luxury, which only the wealthy can enjoy. The determination to enter the field of telephony in competition with the Bell, and as planned by the Standard, is not only absolutely legitimate, but is directly for the public benefit, and should be welcomed, sustained and encouraged by the great masses of our people, and by none more than by the journalistic profession, which depends for its usefulness and influence upon the rapid and accurate transmission of human intelligence.

They say that the Standard is only a stalking-horse for the Bell and that the Bell owns the Standard.

These statements are entirely without foundation. The Standard owns several other companies, but the Bell does not own the Standard. This report, like other wholesale inventions, was started by an irresponsible blackguard in Richmond, Va., in order to stand off telephonic competition in that city.

They say that the Standard does not own the McDonough patents.

The Standard does not depend for its existence upon the McDonough patents, but the Standard owns them, amongst a great many others; the McDonough company is under the control of the Standard.

They say that there must be some fire where there is so much smoke.

That is certainly true. Bell's capitalization is over four hundred millions, and it is fighting for its life. The smoke comes from the hot shot which the monopoly is flinging at the Standard. The Bell was never celebrated for scrupulousness. Its methods are known everywhere. Just now it is putting in its fine work to hoo-doo the public and to thwart competition. All anti-Standard stories have this motive. That is the explanation. Scratch an anti-Standard talker, and you will find some one interested in the Bell, or else a discharged Standard employé. Remember that it is easy in this country to hire people to abuse a corporation, even when its merits and methods are above reproach.

They say the Standard telephone is just like imitation telephones that can be bought in the market.

Like scores of other stories in circulation, this is an entire falsehood. There is not one word of truth in it. No person can buy a Standard telephone except from the company. Everything good may be imitated, but not when it is protected by letters patent. Beware of "fake" telephones.

They say that certain prominent gentlemen left the Standard.

Since the formation of the Standard two or three gentlemen, who intended to act with it, withdrew. They are still stockholders in the company, however. Had 50 men resigned, the Standard would still have remained in the field. Competition in the telephone world was not defeated because two or three gentlemen resigned from the Standard. The company has come to stay.

They say that the Bell will drive the Standard out of business.

Has it done so up to the present time? No.

The above is not very definite information and does not receive in any degree the endorsement of the ELECTRICAL REVIEW. This article from the president of the Standard Telephone Company apparently challenges investigation. We venture to ask a few questions:

1. Under what patents do you expect to earn dividends on your $10,000,000 capital?

2. In what direction has your company been "at work" if not in establishing telephone exchanges or disposing of apparatus?

3. Was not the "wicked circular" to which you allude prepared, signed and sent out by your general manager, Mr. Allen T. Nye?

4. Has your company a manufacturing plant? Where is it?

5. Your announcement, that you would establish a telephone exchange in New York city this year, was the mistake of a too sanguine temperament, was it not?

6. Who is the responsible person to make the silly announcement that the Bell company owned the Standard company?

7. Will you name the "several companies" owned by the Standard?

8. In a word, what business has been done by the Standard Telephone Company, or what business can it do, to justify its capitalization or the capitalization of its sub-companies?

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CHANGES for advertisements must be in this office by Friday noon for the following week's issue. NEW ADVERTISEMENTS should be in the office not later than Saturday noon to insure publication the following week.

NEW YORK, NOV. 20, 1895.

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THE POLICY OF THE NEW YORK ELEVATED RAILROADS.

That there is something radically wrong with the system of elevated railroads in New York city has become a trite assertion. There is nothing wrong with the routes operated by the company or the franchises under which they exist. These franchises are probably the most valuable of their kind in the world. Colonel Hain, the general manager of the company, as far as his personal ability as a railroad man and engineer goes, is, we believe, ranked among the best. What, then, is wrong?

We think the policy of the management toward the patrons of the road is where the trouble lies. This policy is of the antediluvian order—the kind that was partially successful when the company had no competitors. Apparently the board of directors cannot be persuaded that times have changed and that competition of the keenest character is now and will increasingly continue to confront them. The Metropolitan Traction Company, under the able guidance of Mr. William C. Whitney, has been acquiring street railway property in New York city which will eventually give it a complete service all over Manhattan Island. The present cable system under which a part of these lines is now operated is but a temporary makeshift, and sooner than many people may expect some form of underground electric traction will be substituted for it. The company's plans for the change are already formed.

Colonel Hain's recent frank admission that the Manhattan Railway Company was not considering the adoption of electric power, and would not adopt it for several years, shows that the directors of his road do not appreciate the competition they will have to meet. The interview with Colonel Hain in which he expressed himself as above was published in the ELECTRICAL REVIEW and occasioned widespread comment. We know that Colonel Hain could not have voiced his private opinion in the matter, and we know also that he is a believer in the earning capacity of the overhead trolley system on surface street railways. It is reasonable to suppose, therefore, that he has considered using electricity on the elevated roads, and perhaps has tried to persuade his directors to see its advantages. But the antediluvian policy interfered.

The board of directors of the Manhattan Railway Company comprises some of the wealthiest and best known business men in New York city. Is it not passing strange that they cannot grasp the situation which is outlined so clearly before them? If figures count for anything, then these should tell their own story: The net income of the company for the quarter ending September 30, 1892, was $1,174,479 and the charges were $681,089. The figures for the same period of 1895 show net earnings of only $755,064, while the charges have increased to $766,790. The gross earnings for the fiscal year of 1894 were $10,138,143, while those for 1895 were $9,745,926, a decrease of $392,217. In 1894 the operating expenses were $6,095,547 and in 1895 they were $6,132,827, an increase of $37,270. For 1894 the annual report showed a surplus of $240,180. During 1895 this was wiped out and a deficit of $391,788 was created. It is reported that 35,224,861 passengers who formerly used the elevated roads now travel on the Metropolitan Traction Company's cable cars.

If the directors of the Manhattan Railway Company cannot draw a moral from such figures, they would better give way to men who can. It is only just that such financial retribution should follow the antediluvian policy.

A few of the results of this policy are: Totally inadequate service, dirty and badly-ventilated cars, execrable car lighting and steamy, gassy, sooty, noisy engines. The prompt adoption of electric power, no matter in what form, is the only thing that can regain for the elevated roads the patronage they have lost to the surface lines. The same current for moving the trains would furnish light for the cars, and the dirt, cinders and steam would be done away with entirely. The lights in the cars should be placed along the sides instead of under the roof, as at present. If there is one thing more than another which has attracted patronage to the cable cars, it is the satisfactory system of car lighting there employed.

Mr. Russell Sage and his associates in the Manhattan Railway Company's board of directors must get rid of their antediluvian policy. The long-tried patience of the New York public is rapidly waning.

The predictions of the electrical seer that appeared in the ELECTRICAL REVIEW last week created a sensation. Denials have been numerous, yet underlying all of them is a vein of doubt that should give the prophet courage. His statements were more in the nature of hopeful predictions than positive assertions. Just how good an oracle he was a few brief weeks may disclose.

Wall Street and the Electrical Stock Market.

The stock market this w ek had a short recovery. It reacted largely upon covering of shorts, induced by the better feeling over the foreign situation, which, up to the period under review, has been a damper upon values, as it was the cause of quite free selling in American securities. Talk regarding Congressional action of financial affairs was rather reassuring, pointing to a comprehensive currency reform measure calculated to retire the government from the banking business. The export of three-and-one-quarter-million dollars of gold, had it occurred a week ago, would have been attended by heavy liquidation. The advance of prices when shipments were announced shows that they were discounted, and is also proof of the radical change in sentiment. We are paying their debts and that is all there is to it. It was intimated in some quarters that some $20,000,000 more will go before January 1. If Congress requires another object lesson this ought to furnish it.

Electrical stocks participated in the recovery. There was heavy liquidation in Philadelphia Kaffirs, including the Storage Battery securities, the fore part of the week, forcing the common stock down to 28. On the subsequent day it rallied to 38¾ and towards the end of the week went to 45 on the absorption of margined stock which up to that time had been a menace to the market. J. S. Blanche & Co. were largely instrumental in this move. The loosely held stock has been tied up until July 1, 1896. The action has led to quite free buying by New York and London capitalists.

It has been many a day since Wall street was as greatly interested over any statement as the predictions of an electrical man which appeared in the ELECTRICAL REVIEW of last week, concerning the reported retirement of President Coffin from General Electric and the control of the company by J. P. Morgan & Co. A sample of the expression was furnished by Dow, Jones & Co. as follows:

The statement made in the ELECTRICAL REVIEW, that President Coffin, of General Electric, had resigned and the management of the company assumed by J. P. Morgan interests, caused much comment in electrical circles. It has been known for some time that Morgan interests have been very active in studying the business of the company, but it was not suspected that they would become so closely identified with the operation of the company as to undertake its management. In this respect the statement is doubted by those in position to know the facts. It has been suspected for some time that President Coffin would retire from the active management and the definite statement that he has resigned created no surprise. One of the leading directors of the company says that he has no knowledge of the actual resignation having been made as yet.

As to a union between Westinghouse and General Electric interests nothing definite is given. Trade conditions are such as to lead electric people to believe that some sort of an understanding will certainly be arrived at sooner or later because of the money there is in it for both companies.

The street is skeptical in regard to any reports bearing upon a proposed union of these two rival corporations, and it will take an official announcement to make the street believe that there is any truth in it.

It is but fair to say in this connection that parties at interest deny the retirement of President Coffin.

This agitation was largely responsible for the recovery in the stock. The low point was 28¾ on Monday and the high 33 on Wednesday. The decision of the United States Supreme Court in the McKeesport case was another factor in advancing the security. Its greatest effect will be to guarantee the General Electric immunity from damage and royalties.

Of other electrical securities, Western Union recovered from its weakness of last week. Edison Electric Illuminating sold at 97 @ 97¼. The first mortgage five per cent bonds recorded transactions at 108½, the consolidated 5's at 103 @ 103½. American Telegraph and Cable sold at 96 @ 7.

The Central & South American Telegraph Company will lay a duplicate cable. For this purpose it will issue on January 1st, next, $1,417,600 additional capital stock, making the total $7,916,600. The New York Stock Exchange has authorized the listing of the amount when issued.

On the Boston Exchange telephone stocks were rather quiet. Bell was steady around 199½; New England was unchanged at 86 and Erie on limited purchases advanced two points. The speculative position in this last stock is unsettled, there being quite a heavy New York short interest created on the recent slump to 50, that at times has shown uneasiness. Westinghouse securities showed more strength, the common at 35 @ 35¼ and the preferred at 54½ @ 55.

BAIN.

New York, November 16, 1895.

The Standard Telephone Company should make good its promises to enter the telephone business or retire from the field. It has been treated with much consideration by the reputable press, because of the high character of many of the gentlemen identified with it; yet there have been many apparent absurdities and inconsistencies in its various announcements, particularly relating to the establishing of telephone exchanges in Chicago and New York. Some questions and answers—which neither ask nor answer pertinently—appear elsewhere. Perhaps the gayety of the telephone situation will be enhanced by this publication. Anyhow we present it as the latest pronunciamento of this very untelephonic telephone company.

A receiver has been appointed for the Louisiana Electric Light Company, of New Orleans.

LATE NEWS.

Capt. James F. Freeman, inspector of electric lighting for the District of Columbia, died at his residence in Washington last Saturday, after an illness of several weeks.

The Chemung Gas and Electric Light Company, of Elmira, N. Y., capital $200,000, was incorporated on November 16. The directors are: C. G. S. Thomas, Arthur S. Pinkham, Paul C. Safford, Frank McKelvey, John Doyle, George T. Carhart and Albert E. Ettinger, all of New York city.

Chancellor McGill, on November 16, appointed C. W. Boynton, of Woodbridge, receiver of the Rahway Electric Light and Power Company. Mr. Boynton is the principal stockholder. The company furnishes electric light to Rahway, power to manufactories and controls the Union & Middlesex Traction Company,

Captain Mertwago, the naval attaché of the Russian legation at Washington, D. C., on November 16, invited bids from six of the leading electric launch builders for an electric gig for the Czar. This is the result of a special commission that has been sent to him by the Czar, and he has about $4,000 to spend on the boat.

The East River and Atlantic Ocean Railroad Company, of Brooklyn, N. Y., capital, $3,000,000, has been organized to co-operate with the Nassau Electric Company in securing extensions to the latter's trolley system in Brooklyn. Among the incorporators of the new company are P. H. Flynn, president of the Nassau company; Silas B. Dutcher and J. C. Brower. It is expected that formal application will be made to the Brooklyn Board of Aldermen for franchises for from 15 to 20 miles of new track.

Electrical Litigation.

Judges Wallace, Shipman and Lacombe, in the United States Circuit Court of Appeals, at New York city, on November 11, heard the action of the Thomson-Houston Electric Company against the Elmira & Horseheads Railway Company. The case is a contest between the Thomson-Houston and the Westinghouse companies for the control of the switch used on overhead trolley lines. In the lower courts the Thomson-Houston company succeeded in obtaining a perpetual injunction and waived an accounting so as to bring the action to a speedy end.

The Siemens & Halske Electric Company of America, according to a Chicago paper, is preparing a series of suits for infringement against a large number of electric lighting and railway concerns. The device alleged to be infringed is known as the direct-current booster. Notices to the effect that it was claimed as a fundamental patent by the Siemens & Halske company have been sent out to over a dozen concerns who are said to be using it. This company, it is said, will also bring suit against the Lake street "L" road, of Chicago, when the latter installs the third-rail system. The suit will be similar to that started against the Metropolitan "L."

Elevator Bids Opened.

Bids were opened on November 14, 1895, at the office of the Supervising Architect, Treasury Department, Washington, D. C., for all the labor and materials required, and erecting complete, either a hydraulic passenger elevator, including pumps, tanks, piping, car, etc., or an electric passenger elevator, in lieu of the hydraulic elevator, for the United States Post Office, etc., building at Scranton, Pa. The following is the list of bidders:

Otis Brothers & Company, New York, N. Y. Hydraulic, $6,540; electric, $5,570; time to complete, 60 days.

Morse, Williams & Company, Philadelphia, Pa. Hydraulic, $5,260; electric, $3,540; time to complete, 60 days.

Eaton & Prince Company, Chicago, Ill. Hydraulic, $4,700; electric, $3,700; time to complete, 120 days.

Standard Elevator and Manufacturing Company, Chicago, Ill. Hydraulic, $3,870; electric, $2,970; time to complete, 60 working days.

Sulzer-Vogt Machine Company, Louisville, Ky. Electric, $2,540; time to complete, 70 days.

National Elevator and Machine Company, Scranton, Pa. Hydraulic, $3,340; electric, $2,620; time to complete, 90 days.

The Graves Elevator Company, Rochester, N. Y. Hydraulic, $3,625; electric, $3,870; time to complete, 90 days.

Electric Car Fatality — Fifteen Killed.

Last Saturday evening at Cleveland, Ohio, an accident by which 15 people lost their lives occurred in the heart of the city. An electric car plunged 100 feet from the draw of the Central viaduct into the waters of Cuyahoga River. The draw was open to permit a tug to pass, but in some unaccountable manner both the motorman and conductor failed to see the danger signals which, it is claimed, were set as usual. When the motorman saw the car was going through the opening left by the draw, he yelled, forsook his post and ran away. He was arrested later. Two men on the rear platform jumped in time to save themselves. Nineteen passengers and the conductor fell with the car onto the piling, 100 feet below. The car then toppled over into the water. Fifteen bodies have been recovered and four persons are missing.

A Reflector Catalogue.

The Wheeler Reflector Company, 22 Washington street, Boston, has issued a new catalogue illustrating 137 new styles of electric fixtures. Readers of the ELECTRICAL REVIEW who desire a catalogue of this kind will find this one most complete and up-to-date.

Lieut. F. Jarvis Patten makes this bold prediction in the *New Science Review:*

The horse must go, the cable is out of date and the trolley cannot survive it long.

How long is "long"? If the lieutenant will supply us with a definition, his remarks will be in a form that can be criticised.

TELEPHONE NEWS AND COMMENT.

The Southern New England Telephone Company is building a new line through Milford, Conn.

The long-distance telephone system in Germany now reaches 434 towns and cities and includes over 110,000 subscribers.

The Erie Telegraph and Telephone Company made a net gain of 506 subscribers in October. Total number connected, 18,318.

W. H. Butler, the manager of the Ravenna, Ohio, Telephone Company, has contracted with the Kent village council to put in a complete fire alarm system.

It is reported that the telephone service in London, England, is very poor, and that recently subscribers have been deluging the daily papers with complaints.

The American Electric Telephone Company, of Kokomo, Ind., have closed a contract for an entire telephone plant for the St. Joseph, Mo., exchange as well as other contracts for new telephone outfits at Topeka, Kas., and Elkhart, Ind.

The Ohio Valley Telephone Company has decided to adopt the slot-machine device on all local telephones that are used by the general public in Louisville, Ky. Captain Gifford, manager of the company, is the patentee of the device which will be used.

Messrs. Bartley & Spickerman are busily engaged in putting up wires for a telephone service for the village of Sidney, N. Y. They propose to furnish private wires for each patron, and also a connection at a central office with the long-distance telephone now in use.

It is reported that the Erie Telephone Company will this year put $200,000 into real estate and $300,000 into wires. As soon as the bonds already issued are disposed of the policy of the company will be to issue no more, but to use the surplus from earnings above dividend requirements.

The Electric Messenger Company is laying underground telephone wires in Pittsburgh, and will establish a central office in the Standard Building. A through line will be built to Wilkinsburg, with stations at various points. The company, it is reported, has not yet begun to solicit subscribers in Pittsburgh.

The committee appointed by the Board of Freeholders of Middlesex County, N. J., to look into the advisability of granting the East Jersey Telephone and Telegraph Company the right to run their wires over the Albany street bridge in New Brunswick, has notified the company that they have been given the right.

The Hartford, Conn., Street Railway Company is about to construct a telephone line on its suburban roads to enable the conductors to communicate with the car dispatcher in case of accident or delay. A line of telephone wire will be strung on the trolley poles with a connecting wire and hook on every eighth pole. Each car will be provided with a transmitter.

From present indications the American Bell Telephone Company's instrument statement for November will make another big showing. Last month the gross instrument output was 14,969, an increase of 6,141 over October, 1894. Last month's output will no doubt be exceeded this month. The largest month's gross output was in April, 1894, when 18,794 instruments were put out.

During the recent Western trip of Western Union Telegraph officials, Colonel Clowry, speaking in Denver of his early experiences of the Denver Pacific line in Colorado, said: "I was noticing the old poles as we came in this morning. They are the first cedar poles ever used, and I was laughed at when I brought them clear out from Maine. But they have been there now 23 years, and are as good as ever, while the average life of a pine pole is only four years."

The Postal Telegraph Cable Company has declined to accept the right of way into and through Quincy, Ill., on the ingenious terms offered by the city. The conditions imposed were that after the first year the company shall pay into the city treasury two per cent of the gross receipts of the Quincy office. The Western Union has been in the town 40 years with free privileges, and the Postal thinks it is at least entitled to as much without paying percentages on its gross receipts.

The Automatic Telephone Company has been incorporated at Buffalo, N. Y. The company is capitalized at $300,000, and the directors are the following: Oliver Watson, Edward Michael, Henry Koons, Charles E. Clark, Tracy C. Becker and William B. Rankine. All are well-known men. Mr. Rankine is secretary of the Niagara Falls Power Company. Mr. Watson holds 3,000 shares of the stock. Mr. Becker is a well-known Buffalo lawyer. The company will exploit the Strowger automatic system.

George W. Coy reports that he has just completed the organization of a new telephone company in Bridgeport and another in Norwalk, Conn., and that in both these cities contracts have just been signed for a full equipment of instruments. The Bridgeport exchange is to have 600 instruments and the Norwalk company have contracted for 136 telephones. In both instances the companies organized are mutual concerns and the maximum cost of the telephones are to be $20 a year for each instrument.

Oakland, Cal., is trying to collect from telegraph and telephone companies an annual ground rent of $2 for each pole within the city limits. To fix the basis for the rent, the council passed an ordinance directing the companies to number their poles. This the companies neglected to do, and the police then counted the poles, preparatory to a demand on the companies for the rent. The companies will resist collection. The telephone company takes the stand that, as it has a franchise from the council giving it the right to use the streets, the city cannot charge it rent for such use.

The Pennsylvania Standard Telephone Company has applied for a charter. Its object is to organize local companies in the State. The company will, it is reported, ask the Philadelphia councils for permission to install a system in that city. The names of the company's directors are given as follows: Richard W. Clay, R. Dale Benson, Harry A. Berwind, John Story Jenks, Nicholas Lennig, Craige Lippincott, Charles Platt, Winthrop Smith, Philadelphia; William F. Armstrong, Henry P. Nesmith, Jr., Otto A. Theurkauf, New York city; George Moore, Braddock, Pa.; E. L. Fuller, Scranton, and George W. Brand, Pittsburgh.

The Boston News Bureau last Friday published the following dispatch from Kiernan's news agency:

A director of the Western Union Telegraph Company says:

"The Bell Telephone contract expires next Spring, and it will not be renewed.

"The directors would be glad to officially cancel the contract now. The Bell company has broken every clause of its contract with us repeatedly, and they owe us a vast sum of money. As to the Bell Telephone Company going into the telegraph business, I can say it has practically been doing it for three years.

"But there are two sides to that question. There is nothing to prevent us from going into the telephone business, and this we will do. We do not intend to have any connection with the Bell company after the expiration of the contract."

The Metropolitan Electric Company's New Catalogue.

The new catalogue of that progressive Chicago house, the Metropolitan Electric Company, merits more than a passing notice. It is a volume of over 750 pages, bound in the patriotic colors of red, white and blue. Contained within its covers are illustrations, descriptions and prices of every article obtainable in the electrical and allied markets, with an individual code word to facilitate accuracy and brevity in ordering.

This publication has evidently been prepared under the guiding eye of a past-master in the art of convenient and attractive cataloguing.

The present volume is destined to become a book of reference on the desk of every purchaser of electrical goods privileged to receive it.

Available Water Power Going To Waste.

To the Editor of Electrical Review:

In a late issue of your valuable Electrical Review I noticed an article on the transmission of electrical power, which said that ere long much of the machinery of our country will be operated by electrical power generated by water-power.

Now, here in our town are two particularly valuable water-power properties, and I think also another that could be secured at very reasonable figures, the owners taking part stock if properly arranged. Our town should be lighted by electricity.

We are interested in a glove manufactory and would be glad to take power at reasonable rates. A blanket factory here, no doubt, could also use power.

The dams and water wheels on the water-power properties referred to above are all in good repair. Lumber mills and grist mills are playing out in this section, and valuable water privileges should not be allowed to run to waste or to be only partly used.

Our town is well located on the D., L. & W. R. R., and very near the Lehigh Valley R. R., N. Y., L. E. & W. and Elmira, Cortland & Northern. It is a cheap town to live in, and we want additional manufacturing interests.

Respectfully yours,
Wm. J. Payne.

Candor, N. Y., November 14.

The Detroit Electrical Works.

Mr. James I. Ayer is a member of the reorganization committee of the Detroit Electrical Works, and is endeavoring to get the consent of the stock and certificate holders to put through the plan. In response to the statement that many stockholders blamed Mr. Hugh McMillan, the former president and chief owner, for the present troubles of the company, Mr. Ayer is reported as saying, while in Boston recently:

Mr. McMillan feels keenly the position he has been placed in, but his action in foreclosing his mortgage of $200,000 was, he claims, to protect himself. The mortgage was for money he loaned the company and notes he endorsed. He canceled the mortgage after realizing sufficient money out of the quick assets of the company to take up notes, etc., he had endorsed, and he is still a creditor to the extent of $100,000, against $135,000 owed other creditors.

He, with other members of his family, owns about 20,000 shares of stock. He will go into the new company, but will have a minority interest and the new company will not be under his control. When the plan is assured the management of the business will be placed in the hands of a committee of directors for three years, and Boston will have the privilege of being represented on this managing board.

Those who furnish the money for a reorganization will have the handling of the business and men of their selection will manage it.

By following out a policy to devote our attention to manufacture of some particular line, such as motors, and after a careful examination of the situation I feel sure a good business can be developed along this line, and I believe Boston interests in the property, when they understand the situation, will support the reorganization plan.

Power Plant of the Niagara Falls Hydraulic Power and Manufacturing Company.

In view of the efforts being made to utilize the rapids of the St. Lawrence and the Ottawa along the shores of the Island of Montreal, says the *Canadian Journal of Commerce*, for the purposes of supplying power and electric lighting to manufacturers and others, the following description of the power plant being constructed by the Niagara Falls Hydraulic Power and Manufacturing Company will be of interest.

The hydraulic basin, from which water is now taken for furnishing power to the various mills supplied with power by this company, is located parallel to and about 300 feet back from the edge of the high bank of the Niagara River. For this new plant the water will be taken in an open canal from this hydraulic basin to a forebay 30 feet wide and 22 feet deep, which is now being built near to the edge of the high bank. From this forebay penstock pipes, built of flange steel eight feet in diameter, conduct the water down over the high bank 210 feet to the site of the power house on the sloping bank at the edge of the water in the river below the Falls.

The site for the power house is now being cleared. Broken and disintegrated rock, mixed with huge bowlders which have fallen over the bank in past ages, covered the site in places to a depth of 75 feet. The work of clearing this material from the site of the power house, which is now nearing completion, has been largely done by means of a giant or monitor. This is the machine so extensively used in the gold mines of the West for excavating by means of a stream of water. The machine in use at this point is the first used in the East. Below this debris is a stratum of Medina sandstone, on which the power house will stand.

The building will be 60x100 feet, the intention being to add to the length of the building (60 feet) and place other wheels, fed by separate penstocks from the same forebay as above as demand arises. There are four turbine wheels of the horizontal type, furnishing about 8,000 horse-power, to be located in the first floor of the power house. These wheels will work under a head of 210 feet, the highest head under which water has ever been used for power in the quantity proposed in this plant. The pressures exerted by water under this head are enormous, and every detail of the penstock and water-wheels must be designated with the greatest care to hold it.

The penstock leads from the forebay vertically about 135 feet to the top of the sloping bank, thence down the slope to the side of the station next to the bank, making the total length of the eight-foot pipe about 240 feet. Into the building the pipe, 10 feet in diameter, runs horizontally suspended over the tailrace. The thickness of the steel is fifteen-sixteenths of an inch. All horizontal joints are butt-strapped, held with three rows of rivets on each side. The cross-seams are all double-riveted. The necessity for strong work in this pipe will be seen when it is remembered that the total pressure on the end of the pipe exceeds a million pounds. From this horizontal portion of the penstock the water is taken directly up through 60-inch valves onto the water-wheels, which are supported upon iron beams stiffened by braces into the side of the tailrace. The four wheels for this plant are being built by James Leffel & Company, of Springfield, Ohio, under general plans and specifications made by the engineer of the Niagara Falls Hydraulic Power and Manufacturing Company. Three of these turbines are specified to generate each 1,700 horse-power under a head of 205 feet, which is the minimum head estimated as obtainable and to run at a speed of 250 revolutions per minute. As the ordinary head will be from 210 to 215 feet, the power of these wheels will be from 1,800 to 2,000 horse-power each.

The turbines are mounted on horizontal shafts of the double discharge design. These large turbines are fitted with runners 74 inches in diameter, made of extra quality of bronze metal, fitted with balanced gates. The turbines are so designed that the wheel runners are absolutely balanced, due to the equal discharge of water on each side, thus doing away with all end-thrusts on the shafts. The wheels are fitted in cases 11 feet in diameter, made of best heavy plate steel, double riveted. The feeder pipe connection to these large cases are on the bottom of same, being riveted directly to the five-foot hydraulic cylinder valves. All these valves are connected to the main feeder pipe, which is 10 feet in diameter, and occupy the space under the turbines between the foundation walls. The draft-tubes from the turbine pass down each side of the main feeder pipe, connecting with the tail water, which is set at a distance of 27 feet from the center of the turbine-shaft. The shafts are of the best quality hammered wrought-iron, and carried in adjustable ring oiling bearings, mounted on heavy cast-iron bridge-trees.

The James Leffel & Company, who make a specialty of high-grade turbines for high heads and heavy duty, supplied the Cliff Paper Company at Niagara Falls about four years ago with two horizontal turbines of substantially this same design, each of which under 125 feet develops 1,200 horse-power at a speed of 220 revolutions per minute. These wheels are also built from general plans made by Mr. W. C. Johnson, who was at that time acting as engineer for the Cliff Paper Company and had charge of the design and construction of the entire pulpmill plant in which these wheels were used. This plant, which is located adjacent to the proposed new plant, has proved successful in all its details. It embraces several new and important features which had not been attempted before in turbine construction, all of which, with other new and valuable improvements, will be embodied in the new turbines. On each side of each wheel will be placed an electric generator, coupled direct to the water-wheel, and the power will be transmitted by wire to the company's customers. W. C. Johnson, of Niagara Falls, chief engineer of the company, is in charge of the plans for this work.

The Portrush Fatality.

[*From the London Electrical Review.*]

The opinion of Major Cardew, who conducted the inquiry into this fatality, is: That Thomas Walne died from the combined effects of severe injury caused by the fall across the rail and electrical shock; that the tramways in question are at present, when the insulated rail is electrically charged, a danger to the public and an annoyance to the ordinary traffic; that the Giant's Causeway, Portrush & Bush Valley Railway and Tramways Company have not paid sufficient attention to the regulations imposed upon them by the Board of Trade.

We need scarcely remind our readers that Mr. Thomas Walne, when riding through the Portrush district last August, attempted to turn his machine on to the tramway; the machine striking against the curbstone, the rider was upset and fell across the charged rail, where he lay for a few minutes. Although conscious for some time after the accident, he died shortly after he had been removed.

Any one of the findings of Major Cardew would be serious enough, but collectively they form a complete condemnation of the tramway system, and by implication place the responsibility of a man's death on the tramway company. Such a strong opinion will result, no doubt, in the line being closed or altered in such a way that accidents should be quite impossible in future. In speaking of this railway or tramway, we need hardly recall the fact that the track is raised about five inches above the level of the road, and that the working conductor is a stiff iron rail placed some 18 inches above the middle of the track. When employing a high voltage current such a system is primarily a source of danger, and it is most extraordinary that such a line was ever permitted. It may be said on behalf of the company that as the voltage on the working conductor rarely exceeded 250, it could be scarcely considered to constitute a source of danger to the public. No one has any business to assume such a thing. Just as some persons are more predisposed towards disease than others, so there are some more easily affected by electric shock than others. As we said shortly after the accident, Mr. Walne, having ridden through heavy rain, was wet to the skin and would be easily affected by an electric shock. The fact that he was a heavy man and lay for a few minutes across the rails further increases one's belief that he was killed by the electric current. The regulation at the power station was so inefficient that there is no telling whether the unfortunate Mr. Walne received a shock of 250 or 400 volts. One of the company's officials declared that he had observed readings as high as 360 volts, and if this is not exceeding the danger limit, it is at any rate a clear transgression of the Board of Trade rules. The residents along the line contended that the charged rail constituted a danger to horses and cattle, and an annoyance to the public using the highway. The tramway company have recognized this by indemnifying those who have had animals killed. It is obvious that such a system, even if it did no more than put animals to a painless death, is out of the question. The company may suffer, but it is of the highest importance that the public should be adequately protected against such a subtle agent as electricity. Major Cardew, in his report, maintains that the company has infringed four very important rules. As regards the electrical working of the line, it has to be borne in mind that the Portrush Railway is a pioneer undertaking, and some indulgence may be granted to the company on this score, though we do not know that even a pioneer undertaking carries with it the privilege of injuring human beings or animals. It may be that it is impossible to bring the line into accord with Board of Trade regulations; but as these regulations are made mainly for the protection of the public, it is necessary that they should be insisted upon. While the Board of Trade may not have legal powers to immediately close the line, it is to be hoped that the company will act in accordance with their suggestions until they have carried out the alterations decided upon. We do not think the Tramway company have very much improved their position by issuing, after the inquiry, a sort of manifesto which was ostensibly a statement to the Board of Trade. To seek to make the Board of Trade partly responsible for the mishaps on the line, after unmistakable infractions of regulations, is surely not judicious; but to claim special consideration on the grounds that they have helped to increase the valuation of the rates of Portrush is rather absurd. We are not altogether out of sympathy with the company. They have to face many difficulties, but there does not seem to be much disposition to accept the position frankly. An increased capital expenditure is at all times a serious matter, but the safety of the public must be maintained, and the maintenance of this safety means the well being of the electrical industry.

More Catalogues Wanted.

To the Editor of Electrical Review:

If not too much trouble, please have some of the electrical houses of New York send their catalogues of house electrical supplies to,

Yours respectfully,

H. B. Predmore.

19 James St., Middletown, N. Y.,
November 13, 1895.

Electric Traction in Australia.

The subject of electric traction for Sydney has been very much discussed of late, Mr. Eddy, the chief railway commissioner, having returned from his trip to England as delegate to the railway conference quite a convert to the facilities of rapid transit afforded by electricity, says the Sydney correspondent of the London *Electrical Review*. The latest contribution to the question is a report to the Minister for Public Works by Mr. Deane, Engineer-in-Chief of the Railway Construction Branch, as follows: The proposed scheme embraces the construction of several new lines and the conversion of the greater part of the existing lines from steam to electric traction, leaving the outlying portions of the longer lines to be worked by steam. There are in all 11 new lines proposed, of which six are to be worked by electricity, three by cable and two by steam. The new lines to be worked electrically are as follows:

1. From Miller's Point *via* George street to Harris street, where it will verge into the existing steam tramway. This line would accommodate all the traffic from the western suburbs. Estimated cost, £107,091; length, about two and one-quarter miles.

2. From Circular Quay *via* Pitt street, Garden Road, new street through cemetery to the corner of Devonshire street and Castlereagh street, Redfern. On this line the whole of the railway and Botany traffic would be carried, thereby greatly relieving the congestion on Elizabeth street, which would then only carry the eastern suburbs' traffic instead of carrying, as at present, the whole of the traffic, except that carried by the Ocean street cable tram; estimated cost, £102,510; distance, about one and three-quarter mile.

3. From Circular Quay to Nilson's Point, North Sydney, by means of tunnel under the harbor, and thereby giving direct connection between the Redfern and Nilson's Point Railway stations. Two alternative routes are shown for the tunnel, one *via* Fort Macquarie and the other *via* Dawes Point. The best location will have to be determined after detail, survey and borings have been taken; estimated cost, £372,611; distance, about three-quarters of a mile, of which about 550 yards would be actually subaqueous *via* Dawes Point and 770 yards *via* Fort Macquarie.

4. A branch from the George street tramway, at the intersection of Essex street, by means of a subaqueous tunnel to Balmain; this would bring this densely-populated suburb into direct connection with the city by a short tram route. This traffic is now served by a tram taking a very roundabout route, and also largely by ferry boats. Estimated cost, £258,640; distance, about one mile, of which about 600 yards would be actually under water.

5. From Spit road, North Sydney, to the waters of Nosman's Bay; estimated cost, £13,190; distance, about one and one-quarter mile.

6. From Spit road terminus to the Spit, Middle Harbor; estimated cost, £23,380; distance, about one and one-half mile. This line would no doubt be eventually extended to Manly.

It is proposed that a central station be erected at the head of Darling Harbor for working all lines on the southern side of Port Jackson, the lines on the north shore being worked from the present power-house, which would be remodeled for the purpose, the present cable tramway being converted into an electric tramway.

The approximate estimated cost of the complete system as described is as follows:

Track construction:	
New electric lines	£247,902
Duplicating existing lines	35,370
New steam lines	63,126
New cable lines	101,347
New electric line, North Sydney	19,140
Buildings, chimneys and engine foundations	150,694
Power plant, city and suburbs	144,100
Rolling stock	415,888
Distribution of power	126,940
Distribution of power, rolling stock and alteration in power plant, North Sydney	43,340
Total	£1,748,047

Mr. Deane adds that, of course, the above figures are only correct if the whole of the scheme is carried out. The cost increases in about the same ratio as the number of miles dealt with decreases. For example, take the George street tramway. According to the above figures its cost would be £107,000, while, if it were carried out quite independently, the cost would be £140,000. The estimate does not cover land resumption; but it is estimated that on account of land required being mostly located in the suburbs, the cost thereof will certainly not add more than 10 per cent to the total cost of the scheme. As to the probability of the scheme being a paying one, the total capital—that is, the cost of existing and proposed new tramways on which interest would have to be paid—would amount to about £3,000,000 sterling. Taking as a basis the earnings of the year 1893-94 on the lines affected to have been about £230,000, Mr. Deane is of opinion that this would be fully doubled—that is to say, £460,000. To arrive at the probable expenditure it is assumed that five times as many car miles would have to be run as tramway train miles were run in the year above mentioned; viz., about 8,700,000 car miles, which at 6d. per car mile would amount to £217,500 per annum, which would leave net earnings amounting to £242,500. This would pay interest at the rate of about eight per cent per annum, on a capital of £3,000,000 sterling.

The Quaint Club to Entertain Newspaper Men.

The annual meeting of the Quaint Club, of New York, was held at the Waldorf Wednesday night of last week. Geo. H. Daniels and Chas. W. Price were re-elected president and vice-president, respectively, and Chevalier C. A. Baratonni was re-elected secretary and treasurer. Messrs. Julian Ralph, J. W. Keller and Arthur F. Bowers were elected members out of a large waiting list. It was voted to have newspaper men as the guests of the members at the next dinner to be given at the Waldorf, December 19.

EXPLOSION IN THE BRUSH COMPANY'S PLANT.

LOWER PART OF NEW YORK CITY WITHOUT LIGHT FOR ONE NIGHT.

Last Friday night the lower part of New York city was dark in spots for the first time since Mayor Grant cut down the overhead wires. The cause was an accident in the Elizabeth street station of the Brush Electric Light Company.

Just after the day force of employés came on duty Friday morning an elbow in the eight-inch steam main blew out and filled the building with steam. The explosion drove part of the elbow through the iron floor and shook up the station pretty thoroughly. The chief engineer and his assistants rushed out of the engine room and shut off the steam, but not before it had done considerable damage.

The hot, dry steam went up the elevator shaft to the dynamo room and spread through the building. After a half hour or so the men ventured back into the engine room and discovered that the steam had withered up every belt in use. The belts were from eight to 48 inches wide. A new set of belts is kept in stock for emergencies, and these were at once got out and the whole staff of employés set to work to fit and splice them. In the meantime the broken elbow in the steam main had been repaired. The damage to the belts is reported at $3,000.

Below Fifty-ninth street the Brush company serves about 1,000 street lights and as many more commercial lights. A part of these were in operation by eight o'clock in the evening, but later another shut-down was caused by one of the new belts slipping. By Saturday night the service had reached its full efficiency again.

American Society of Mechanical Engineers.

The sixteenth annual or thirty-second meeting of the American Society of Mechanical Engineers will be held in the society's parlors, 12 West Thirty-first street, New York city, from December 3 to December 6, inclusive. Among the professional papers to be read are the following:

Samuel McElroy: "Water Power of Caratunk Falls, Kennebec River, Me."

Samuel Webber: "Water Power, its Generation and Transmission."

W. F. M. Goss: "Tests of a Ten-Horse-Power De Laval Steam Turbine."

D. S. Jacobus: "Experimental Method of Determining the Effective Center of the Light Emitted from a Standard Photometric Burner."

Jno. H. Barr: "The Proportions of High-Speed Engines."

Among the topical questions to be discussed at the meeting are these:

What information can you give as to the best method for the extraction of oil from condensed steam, where it is desirable to use the exhaust steam repeatedly for boiler feed purposes?

What rule is there for determining approximately the horse power required to drive disk fans for exhausting and ventilating?

Has any one found it to pay to exhibit in recent International Expositions, where to do so entails a cost of attendance, transportation and other heavy charges?

A reception and conversazione will be held at Delmonico's on Thursday evening, December 5. There will be dancing after the supper, which will be served at ten o'clock.

During the meeting visits will be made to prominent manufacturing establishments in the vicinity of New York, including the Ball & Wood Engine Company's plant at Elizabeth, N. J., and the eastern power house of the Brooklyn City Railroad.

Special railroad rates of a fare and a third for the round trip to New York have been secured for those who will attend the meeting.

American Institute of Electrical Engineers.

The one hundred and first meeting of the Institute will be held at 12 West 31st street, on Wednesday, November 20th, at 8 o'clock P. M.

The meeting will be devoted to a topical discussion on "Storage Battery Applications."

Several members having had experience in this field have expressed their intention of giving their views, and communications on the subject have already been filed by Messrs. Arthur E. Childs and C. L. Edgar, of Boston; Dr. F. B. Crocker and Mr. Nelson W. Perry, of New York city, and Mr. Carl Hering, of Philadelphia. It is the wish of the Committee on Papers and Meetings that all members who can contribute something of interest on this occasion, should send in communications in case they cannot be present.

A similar meeting of western members will be held the same evening, Wednesday, November 20th, at 8 P. M., in the rooms of the Western Society of Engineers, 1737 Monadnock Building, Chicago.

The council will hold its regular monthly meeting in the rooms of the Institute, 26 Cortlandt street, Wednesday, November 20, 4 P. M. Members who desire to present papers before any meeting during the season should communicate with the secretary.

The Electric Potential.

Mr. Frank Ridlon, president of the Electric Potential, of Boston, has issued a call for a meeting of that body at Young's Hotel on Monday evening, November 25, at 6.30. After the usual banquet a paper will be read by Captain Brophy on the subject of "Underground Wires and High Tension Currents." As Captain Brophy is eminently qualified to talk on these subjects, his paper is expected to be very interesting, and will be followed by a general discussion on the points raised by a number of the members. President Ridlon will preside, and hopes to see a large attendance.

Machine Tools For Electrical Manufacturers.

The illustrations presented herewith show three machine tools, selected from many, built by the well known Garvin Machine Company, Laight and Canal streets, New York city. These machines, because of their wide range of work, large capacity and rigidity, are peculiarly adapted for use in the manufacture of electrical machinery.

Fig. 1 represents their No. 3 universal milling machine. The design and construction are the result of over 25 years' experience in jobbing and manufacturing, and a careful study of the requirements of the trade. It embodies several new and valuable features.

The column, or frame, is cast in one piece, thus securing the greatest rigidity to the machine. The center is so arranged as to allow for the expansion of the arbor due to heat from the cutter, and at the same time hold the end perfectly firm.

The spindle is steel, of large diameter, having the front bearing tapered, and provided with standard hardened and ground anti-friction washers.

The feed mechanism is not carried by the table, but is attached to the swiveling block; is self-adjusting, and allows the table to operate by power with perfect freedom at any angle up to 45 degrees either way. It will trip automatically at any point, with the table running in either direction.

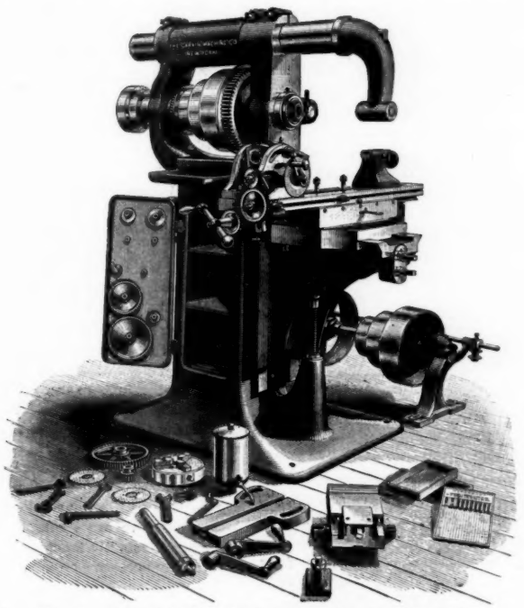


FIG. 1.—GARVIN'S NO. 3 UNIVERSAL MILLING MACHINE.

Fig. 2 represents Garvin's No. 3 improved Lincoln pattern milling machine, which has been brought out in response to the demand for a milling machine of this pattern of sufficient power and durability to withstand the most severe usage, and, while it is of the same general design as the smaller Lincoln pattern of their make, it is much larger and heavier, with increased power, larger and longer bearings, increased wearing surfaces, steel feed gears and many new features not heretofore found in this class of machines, and with every detail carefully considered and proportioned. It is peculiarly adapted to milling heavy forgings, steel castings and for heavy slabbing.

The bed is 66 inches long, 15 inches wide and 10 inches deep, and is mounted on a stand with oil pan, tank and pump, as in screw-machine practice.

The table is of very ample proportions, has a bearing-in cross-slide of more than half its length, two T-slots, and is powerfully fed its entire length by a large bronze screw running in oil, and engaging with a coarse pitch spiral rack cut on the underside of the platen its full length.

The spindle is of steel, with tapered front bearing, running in a solid bronze box with hardened and ground anti-friction washers to take the thrust. It is also provided with self-oiling facilities and means of adjustment for wear. The front end has a tapered hole to receive the arbor, which is held in place and removed by a stud bolt passing through the spindle, and operated from rear end.

The cone is of ample proportions, and swings in a frame so arranged as to readily adjust itself to the various positions of the spindle.

The feed cones are arranged to keep the belt always at the proper tension, insuring a steady, positive motion to the table.

The tail stock is cast solid with its base, and is readily adjusted to any part of the bed in line with spindle.

In order to have the milling machine produce the greatest amount of accurate and satisfactory work it is necessary to keep the cutters sharp, and to do this Garvin's No. 3 universal cutter and tool grinder, shown in Fig. 3, is best adapted.

This machine has recently been improved, and now embodies many new and valuable features, making it more convenient and better adapted to its line of work than any machine of the kind now on the market. The front bearing is extended, forming an outboard support for the end of the spindle, thus preventing any vibration. The spindle is hollow, and is provided with a rammer for removing the arbors. The rear end extends beyond the bearing and is arranged to carry emery wheels up to eight inches diameter. A rest is also provided for grinding small drills, light tools, gear-tooth cutters, etc.

FIG. 2.—GARVIN'S NO. 3. IMPROVED LINCOLN MILLING MACHINE.

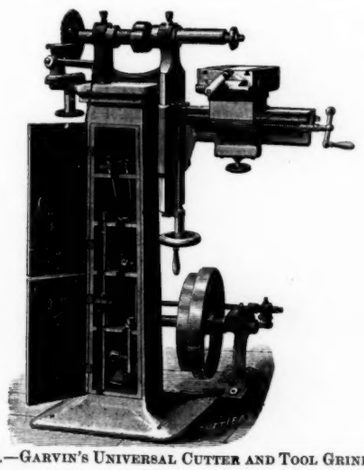


FIG. 3.—GARVIN'S UNIVERSAL CUTTER AND TOOL GRINDER.

Cylinder Head Blows Out in the Cincinnati Edison Station.

Another accident occurred in the station of the Edison Illuminating Company at Cincinnati, on November 11. On this occasion an engine cylinder head blew out and tore a hole 6 by 12 feet in the wall. No injuries to any employés were reported.

Root Improved Boilers in the New Electric Light and Power Station, Hamilton, O.

The equipment of the model electric light and power station recently erected by the city of Hamilton, O., has called forth much praise from electrical engineers and others who have visited the plant and inspected the machinery.

The Hamilton *Republican*, in an exhaustive description of the plant, calls particular attention to the Root improved water tube boilers employed (there is a battery of two of these boilers, each 208 horse-power), and says:

The electric light committee is to be congratulated upon their selection of these boilers for the city's new electric light plant. In so doing they have acted in accordance with the judgment of the best engineers of the city.

The Overworked Motor and What It Did.

It was only a little electric motor, shoved away in a dark corner where the dust could settle down and be undisturbed from New Year's till Christmas—an overworked, dirty little motor. A motor that finally in fiery language objected to the ever-increasing load; but the master simply screwed down the brushes more tightly and added an additional burden. Then the little motor concluded that it was time to teach somebody a lesson, and the total cost of that lesson is now estimated by the insurance officials at $65,000. The new motor installed in the new factory will enjoy living in a small dust-proof apartment, will be regularly and thoroughly cleaned, and probably will never be overworked.—*Electrical Engineering.*

An Experimental Electric Motor Destroyed by Fire.

The New York & Putnam Railroad Company sustained a $15,000 loss by fire, on November 13, by the burning of a car shed and a number of loaded freight cars at Van Cortlandt Park. The insurance will not cover the loss. Included in the property destroyed was an experimental electric motor. It was built by the company at Van Cortlandt Park at an expense of $8,000. It was a new invention and the company maintained the greatest secrecy concerning it. It was given a successful trial early last week. The origin of the fire is a mystery.

The Portland, Ore., Transmission Plant.

In the description of this plant, which appeared in the ELECTRICAL REVIEW for October 16, 1895, the writer of the article said: "The four-wire system is worked at 1,000 volts between wires, and by means of feeder regulators a variation of four per cent in either direction is covered."

This should read: "The four-wire system is worked at 133 volts between any two wires, and by means of feeder regulators a variation of seven and one-half in either direction is covered."

ADVANCE INFORMATION.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week.

Electric Light and Power.

FLUSHING, L. I.—A contract has been closed with the Flushing Electric Light Company to light by arc electric lights Main street from Broadway to the free library, and Broadway from the bridge to the town hall. This embraces the business section of the village. The lights will be in operation January 1. The officials of the electric light company will build at once an extension to their present plant.

BLACKSTONE, R. I.—It is now definitely settled that a local electric plant is to be established in town to furnish electric lights for street service and incidentally to furnish incandescent or arc lights to private individuals.

CONTOOCOOK, N. H.—The Contoocook Electric Light Company has been incorporated. Its object is to furnish light to the towns of Hopkinton and Warner. Its capital stock is $10,000 and Hon. W. S. Davis heads the list of incorporators.

SALEM, ILL.—The matter of establishing a system of electric lights in this city is being considered.

UNION SPRINGS, ALA.—An electric light plant of 20 arc lights is to be established. P. L. Cowan, clerk.

LITTLE VALLEY, N. Y.—An election was held recently to vote on the question of issuing $7,000 in bonds for an electric light plant.

HUME, MO. — Efforts are being made to establish an electric light plant of 800 or 1,600 candle-power lamps.

PLATTSBURG, N. Y. — Plattsburg Light, Heat and Power Company has increased its capital stock from $100,000 to $125,000.

OWENSBORO, KY.—An election will be held to consider issuing $25,000 in bonds for an electric light plant.

MILFORD, N. H.—The new dynamo at the electric light station is to be of 1,200-light power.

BETHLEHEM, N. H.—The electric light plant will be in operation about January 1.

MILWAUKEE, WIS.—The Barlin Electric Light and Power Company offers to sell its plant to the city for $20,000.

BOSTON, MASS. — In putting their wires underground, the Boston Electric Light Company has already expended $300,000, and estimates that the entire cost of doing this will be $900,000

LEECHBURG, PA.—The Leechburg Electric Light and Power Company has been incorporated with a capital of $16,000.

GOUVERNEUR, N. Y. — The Gouverneur Electric Light and Power Company, of Gouverneur, has been incorporated to manufacture and use electricity for light, heat and power. The capital stock is $500, consisting of shares of $5 each, and the directors for the first year are: Carrie McCrea, J. P. Killmer and J. R. McIntyre, of Gouverneur.

ST. JOSEPH, MO.—The St. Joseph Railway, Light, Heat and Power Company, the capital stock of which is $3,500,000, with 1,500 shares of preferred stock and 200,000 shares of common stock. William H. Harriman, of New York, holds 75,000 shares of preferred stock, and Camille Weidenfeld, of Oyster Bay, Long Island, 75,000 shares. The common stock is held as follows: George D. Patton, Plainfield, N. J., 10,000 shares; Alfred Deckers, South Orange, N. J., 9,980 shares; R. A. Brown, 10 shares; W. T. Van Brunt, 5 shares, and J. H. Van Brunt, 5 shares, the last three being residents of this city.

New Electric Railways.

ST. LOUIS, MO. — The Southern Electric Railway Company have been granted permission to extend their lines.

SHELBURNE FALLS, MASS.—The proposed electric road between Shelburne Falls and Coleraine City will probably be constructed at a cost of $75,000. A meeting of the committee was held recently and Herbert Howell was elected chairman, and Albert J. Amstein, of Buckland, secretary.

OWOSSO, MICH.—Work has begun on electric line between Owosso and Corinne. It will be rapidly pushed forward to completion. The company is backed by plenty of capital.

FENTON, MICH.—John E Nolan, of Saginaw, has been granted franchise to construct an electric railway from Fenton to Flint. It will also connect with Long Lake.

GEORGETOWN, KY.—The Georgetown street railway will probably construct an electric power plant.

ST. JOSEPH, MO.—The St. Joseph Traction and Lighting Company has reorganized and it will hereafter be known as the St. Joseph Railway, Light, Heat and Power Company. The capital stock is $3,500,000; of this $1,500,000 is preferred stock.

FENTON, MICH.—An electric railway from this place to Flint is promised to be in operation in July, 1896. John E. Nolan, of Saginaw, has a franchise.

TOLEDO, OHIO.—J. K. Tillotson, of this place, has closed a contract for the construction of 15 miles of electric railway in Oshkosh, Wis., besides 26 miles of suburban line surrounding that place.

DENVER, COLO.—It is again reported that there is a plan on foot for the consolidation of the Tramway and City Cable Company's systems under one management.

CAMBRIDGE, PA.—The electric railway between this place and Edinboro, on which work is about to commence, will be extended to meadville, *via* Venango and Saegertown. The line will be 22 miles long, and the estimated cost is $12,000 per mile, a total of $264,000.

SEBEC, ME.—Citizens of this place are beginning to agitate the building of an electric railway from this town to Dover.

NEW YORK, N. Y.—The North End Street Railroad Company has been incorporated. The capital is $5,000,000. The road is to be 13 miles long. Thomas F. Ryan is the largest stockholder. The directors are Daniel H. Shea, Thomas J. Regan, Pierre Jay, Frank F. Ogston and William C. Shailor, of New York; Edward K. Lynch, William D. Davis and Thomas E. Laughlen, of Brooklyn, and Charles H. Sisson, of Mount Vernon.

CATSKILL, N. Y.—Louis E. Robert, W. C. Wood, M. W. Conway, Jacob Faber, J. L. Heins, D. H. Gilligan, W. S. Roberts and H. A. Mack, of Brooklyn, are among the stockholders of the Catskill, Cairo & Windham Street Railroad Company, incorporated with a capital of $100,000, to build and operate a street surface road 10 miles long in Greene County.

PALMER, MASS.—The directors of the Palmer and Monson Street Railway Company have been granted permission by the Selectmen to build a street railway through certain streets of the town.

New Manufacturing Companies.

OSHKOSH, WIS.—Central Construction Company has been incorporated by E. E. Stevens, William F. Gruenewald and M. A. Greenlaw, of Oshkosh, to build a line of electric railway in Oshkosh, and from Oshkosh to Kaukauna. Capital stock, $300,000.

JERSEY CITY, N. J.—The Mexican National Exposition and Land Company has been incorporated by John R. Dos Passos, Juan M. Ceballos and H. B. Hollins, of New York; John P. Stockton, Trenton, N. J., and C. N. Jordan, Brooklyn, N. Y., to establish electrical works, etc. Capital stock, $1,000,000.

ST. PAUL, MINN. — Standard Brass and Electric Company has been incorporated by J. W. Jaggar, Jacob Heilbrun, Theodore Grutting. Capital stock, $50,000.

BROOKLYN, N. Y.—The Towne Car Fender Company, incorporated to manufacture and vend safety fenders for use on street and tram cars, has a capital of $5,000. This is divided into $50 shares, which are taken. Edgar B. Towne, Port Richmond, 26 shares; Franklin S. Towne, Kingston, 26; Samuel R. Chase, Frank R. Eden, Bayonne, N. J., each six; Stephen W. Mahon, New York, 30, and Edward Swann, New York city, six.

ST. JOSEPH, MO.—Safety Arc Lamp Hanger and Improvement Company, with a capital stock of $25,000, fully paid up. The stockholders are John L. Zeidler, Francis L. Myers, E. P. Snowden, Warren Snowden, James M. Wilson, H. D. Bassett, W. B. Shultz, C. A. Heshong, A. M. Disque, and John Schleicher. The company will manufacture and sell an appliance to be attached to arc lights by which they can be instantly taken out of a circuit for any necessary repairs.

Business Troubles.

CHICAGO, ILL.—The International Telephone Construction Company, whose office is in the Rialto Building, has made an assignment to Lynden A. Seymour.

JERSEY CITY, N. J.—Application was made to Chancellor McGill, in Jersey City, on November 13 for the appointment of a receiver for the Rockaway Electric Light Company, which supplies the lights for Rockaway Beach. The Chancellor granted an order to show cause why a receiver should not be appointed.

NEW YORK CITY.—Justice Lawrence, of the Supreme Court, on November 9 dissolved the Electrical and Mechanical Engineering Company, of 41 Cortlandt street, and made the temporary receiver, Jonathan H. Vail, permanent receiver. The liabilities are $26,500.

New Telephone and Telegraph Companies.

BUFFALO, N. Y.—The Automatic Telephone Service Company has been incorporated to provide for the use of the Strowger Automatic Telephone; capital, $300,000. Directors, Oliver Watson, Edward Mitchell, Henry Koons, Charles Eck and Tracy C. Becker, of Buffalo.

BROCKTON, MASS.—The Aldermen have passed an order permitting the Southern Massachusetts Telephone Company to lay underground wire conduits.

HARTFORD, CONN.—The Hartford Street Railway Company is about to construct a telephone line on its suburban roads, to enable the conductors to communicate with the car dispatcher in case of accident or delay. The device is the invention of W. C. Fielding, of this city.

Increase of Capital Stock.

NEW YORK CITY.—The stockholders of the Commercial Cable Company will hold a special meeting in this city on December 3 to consider and vote upon the question of increasing the capital stock $250,000.

Proposals Wanted.

BUTLER, PA.—Councils have decided to put in a fire alarm system and are open for proposals. Address, Harry Grieb, chairman fire committee.

PERSONAL.

Mr. Frank B. Parsons, of Boston, New England manager for the Safety Insulated Wire and Cable Company, spent a few days in New York city last week.

Mr. W. D. Packard, of the New York & Ohio Company, Warren, Ohio, manufacturers of the Packard incandescent lamps, was among last week's visitors to New York city.

Chas. L. Ackerman, formerly of New York, is now connected with Mr. W. T. Heger, of the Westinghouse Electric Manufacturing Company, Mills Building, San Francisco, Cal.

Mr. E. P. Clark, general manager of the Consolidated and Interurban electric railway systems of Los Angeles, Cal., is visiting the East and spent last week in New York city.

Mr. W. J. Clark, manager of the General Electric Company's railway department, returned to New York city last week after an extended trip through the West, including the Pacific Coast.

Col. J. W. Marsh, of the Standard Underground Cable Company, recently returned from a hunting expedition in the Adirondacks, where he won distinction as a deer shot bringing down his first pair of big antlers.

Mr. John A. Seely, the electrical contractor, is in the West looking after a number of electric railway contracts, and investing also in all the ancient clocks that he can find, this being one of the fads of this always-on-time electrical gentleman.

Mr. A. H. Reece, for several years connected with the General Electric Company, is now manager of the Woods Manufacturing Company, of Chicago, makers of "Solarine" metal polish. "Papa" Reece was always a shining light in the electrical field, and it seems that he is still shining.

Mr. F. A. Flinn, formerly of Miller & Flinn, paper dealers of 132 Beekman street, New York, has assumed the business personally and will continue at the old stand. Mr. Flinn has hosts of friends in the business, is a gentleman of high standing in the field and we extend to him best wishes for continued success.

Mr. John A. Brill, the widely-known electric car manufacturer of Philadelphia, passed through New York city last week with a gripsack filled with orders. The Brill company is doing an immense business, probably the largest in its history, and in addition has the satisfaction of pleasing its customers with the high-grade product turned out.

The telephone line between Richmond and Rosenberg, Texas, is completed.

The City Electrician.

The city electrician is coming to be a very important functionary in a good many American municipalities, and the tendency to load upon him a variety of new and unrelated duties is viewed in electrical circles with some concern, as the whole drift in modern electricity is necessarily towards specialization, says the New York *Evening Post*. The office owes its creation usually to the existence of a city fire alarm bureau or a police telegraph system. The movement in favor of underground wires has in many places added the supervision of a subway system; and latterly the control of all the interior wiring has been intrusted to the same official, as in Pittsburgh and Philadelphia. Meanwhile, about 200 communities of all sizes have established municipal electric light plants, and, where possible, these are directed by the same city electrician, as in Chicago. In one or two States there is an agitation afoot for municipal telephone exchanges, and the overloaded official now has to deal with the problems of the intricate telephone art. Not only this, but in Detroit the electrical engineer of the city lighting commission has had to take the unruly and superabundant shade trees in hand; while in the same city the spirit of Pingreeism has now gone so far as to demand the municipalization of the trolley car tracks. Just where this will all end no electrician can well foresee; but it is already obvious to the professors of electrical engineering in American colleges that their courses cannot be too comprehensive. There is a marked improvement in the personnel employed in this c ass of work, which once fell generally to a smart telegraph operator with a political pull; but now, in regions as far apart as Massachusetts and Minnesota, it is allotted to experts, often college-bred, who have not merely practiced the art, but are familiar with its theory.

Mexico's International Exposition.

The great International Exposition of Industries and Fine Arts, authorized by the Federal Government of Mexico, by concession dated January 9, 1895, will be inaugurated in the City of Mexico and will remain open for a period of at least six months. It will probably be dedicated on April 2 as a national exhibit, and the formal opening of the international exposition will take place on September 15.

The exposition is to include all kinds of industries, scientific, commercial and artistic productions, and to embrace, in fact, the whole range of human activity.

The exposition grounds are situated at the foot of the historic Castle of Chapultepec, on the grand Avenue de la Reforma, within 10 minutes' ride from the center of the City of Mexico, and comprises an area of over 600 acres.

The Mexican Government in authorizing this great international exposition, does so with a knowledge of the fact that if the Republic of Mexico is given the proper expansion to the export trade she will consume one hundred times the amount of imported goods she takes at present.

The Director-General, and those who are aiding him, are thoroughly conversant with all that is requisite to carry out this, the first exposition ever held in the Sister Republic, and in such a manner as to reflect much credit on the Mexican Government, who have authorized and sanctioned this exposition under the act of Congress and the official approval of President Porfirio Diaz.

The fact that an exposition of this nature will be of great interest to the manufacturers of the United States has prompted the board of directors to open general offices at 45 Broadway, New York, where all necessary information can be obtained.

From Chicago to the Pacific Ocean in Three Days.

Rapid transit is in the air. It has not only affected all lines of traffic throughout the East, but one of the great trunk lines of the West has recently shortened the time between the city of Chicago and Los Angeles, Cal., by 24 hours. This trip can now be made on a magnificent vestibuled train known as the "California Limited" over the Atchison, Topeka & Santa Fé Railroad, familiarly known as the "Santa Fé route." This service was opened to the public October 29, 1895, and through the courtesy of Passenger Traffic Manager W. F. White and General Passenger Agent George T. Nicholson a representative of the ELECTRICAL REVIEW was privileged to inspect the beautiful vestibule train which started from Chicago on that day.

The trains supplying the service are all new and are composed of Pullman sleepers with latest parlor chair cars, dining cars and sumptuous Pullman compartment sleepers. The train was inspected by a number of eminent railroad men and compliments to Mr. White and Mr. Nicholson were numerous and sincere. An artistic four-page leaflet relating to this train can be secured by addressing the above-named gentlemen at the Monadnock Building, Chicago.

Chicago & Alton Railroad.

The Chicago & Alton Railroad, the great triangular through line connecting Chicago, St. Louis and Kansas City, has for a decade or more sustained an enviable reputation for the excellence of its passenger service. It has always occupied a position in the front rank in this respect. A recent admirable arrangement is a through line from Chicago to Peoria, the service being thrown open to the public September 29, 1895. This spirit of progress is greatly appreciated by the citizens of Peoria, as well as by numerous travelers who visit that important and growing city.

The ELECTRICAL REVIEW takes pleasure in calling attention to the progress of the Chicago & Alton Railroad and expects soon to see it establish an electric railway system covering its large suburban traffic.

Chicago Electrical Contractors Hold a Meeting.

A number of Chicago electrical contractors, supply men and members of the Building Trades' Council, met recently to develop a plan looking to the interests of skilled workmen and the securing of better prices and to arrange for some satisfactory basis on which bids could be made. A committee of three was appointed to draw up resolutions and to report to a meeting to be called later.

Second-Hand Engines and Boilers For Sale.

Two 9½x10, double, 125 horse-power, Armington & Sims.

One 15x20, 150 horse-power, Ide.

One Boiler, 66 in. diameter and 16 ft. tubes.

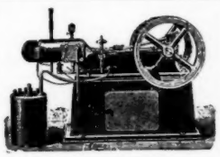
Two 50-light Westinghouse Alternating Arc Machines with lamps. An excellent factory installation.

All in good order and condition. Only for sale on account of being replaced by larger units.

Also a lot of Dynamo Pulleys; prices on receipt of dimensions.

Apply to

N. B. Gas and Edison Light Co.
New Bedford, Mass.



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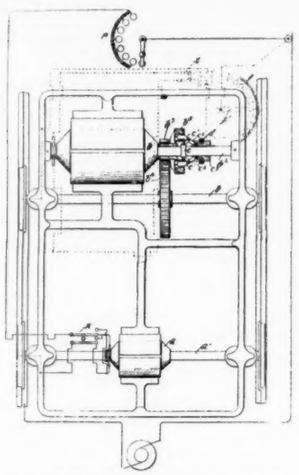
ELECTRICAL PATENTS

ISSUED NOVEMBER 12, 1895.

549,485 Electric locomotive; F. B. Badt, Chicago, Ill. — An electrically propelled vehicle, consisting of a starting motor for starting the vehicle from rest, and of a speed motor for propelling the vehicle at normal speed.



No. 549,485.—ELECTRIC LOCOMOTIVE.

549,491 Railway telephone system; W. H. Clewley, Providence, R. I.

549,501 Electric shunting device; A. B. Depuy, Camden, N. J.—A galvanoscope, having fixed to the axis of the needle a cam situated between two flat contact springs; the springs being connected respectively, one with the coil of the galvanoscope and the other with the ground.

549,502 Dynamo brush; J. Dickson, London, Eng.—Plaited and compressed wires inclosed in the wire gauze jacket having its outer edges secured by wire stitches and its ends covered by the securing cap.

549,522 Electric motor system and traction device; T. P. Milligan, South Orange, N. J.—Comprises a track, a motor having positively driven wheels on both sides of the track, and means connecting the driving wheels with the load, whereby the driving wheels are independently caused to grip the track

549,542 Electric elevator; H. R. Smith, Chicago, Ill.—A car, an electric motor, an electric switching device arranged in the motor circuit, a circuit for controlling said switching device, and means carried by the car for varying the current in said switch-controlling circuit.

549,556 Automatic electric cut-off; C. E. Whitney, New York, N. Y.

549,577 Arc lamp globe holder; G. L. Moyer, Hartford, Conn.

549,580 Conduit electric railway system; B. E. Osborn, Auburn, N. Y.

549,597 Combined rheostat and reversing switch for electric motors; J. P. Fiske, Alliance, Ohio.—A frame and a tray secured thereto, a resistance coil retained in position by said tray and having its convolutions insulated from each other, and a contact device adapted to be passed transversely over said convolutions whereby to include more or less of said resistance coil in an electric circuit.

549,598 Electric controller; J. P. Fiske, Alliance, Ohio.

549,608 Electric controller; W. H. Morgan, Alliance, Ohio.—A frame for a controller, consisting of two open castings secured together so as to form a shell or casing having elongated openings.

549,621 Controller for electric motors; M. J. Wightman, Scranton, Pa.—Consists of two electric motors and their multiple series controller, a switch and connections whereby said motors may be run in multiple, each with its own controller resistance or other means for governing its operations.

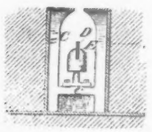
549,636 Electrical steering gear; G. S. Grimston, London, England.

549,642 Friction appliance for electric cars; I. W. Heysinger, Philadelphia, Pa.

549,644 Regulation of alternating generators; F. P. Ide, Eau Claire, Wis.

549,649 Storage battery; M. Moskowitz, Newark, N. J.

549,652 Underground electric propulsion; J. E. Parker, New York, N. Y.—A rectangular conduit, having a continuous flange on the base thereof, and a removable cover in which the slot is formed, in combination with a removable iron cross-frame adapted to support the underground conductor and the removable cover.



No. 549,652.—UNDERGROUND ELECTRIC CONDUIT.

549,655 Contact device for electric railways; C. A. Philipsborn, Berlin, Germany.—A contact device having two independent laterally extended contact surfaces, and a third intermediate yielding contact surface, each surface adapted to a line conductor.

549,663 Carbon brush-holder; G. H. White, Chicago, Ill.

549,709 Multiple telegraphy; T. B. Dixon, Henderson, Ky.

549,715 Electric clock system; A. Franke, Berlin, Germany.

549,724 Bracket for incandescent electric lights; W. R. Hitchcock, Cornwall, Canada.—A flexible bracket for an incandescent electric light, consisting of a chain secured to the wall plate at one end and to the lamp socket at the other, and a flexible covering embracing the said chain and the wires supplying the current to the said lamp socket.

549,731 Carbon clamp; K. A. Lantau, Chicago, Ill.

549,794 Lightning and heavy current arrester and alarm; M. R. Hutchison, Mobile, Ala.

549,802 Telephone transmitter; I. Lucas, Passaic, N. J.—Comprises a casing, a diaphragm, contact disks, one of which is engaged by a point on the diaphragm, and a filling made of silver and placed in the casing at the back of the diaphragm and embedding the said contact disks.

549,803 Telephone transmitter; I. Lucas, Passaic, N. J.—Consists of material to be used between the buttons of telephones and like instruments, comprising a base of reticulated metal having a coating of granulated carbon on one side or surface thereof only.

549,810 Electric switch; W. T. Mottram, Dallas, Tex.

549,855 Composition of matter for compressed or molded articles; R. H. Platt, Hartford, Conn. — A composition for an electrical insulating material consisting of asbestos, rubber and soapstone or other insulating equivalents.

549,860 Telephone; A. Stromberg, Chicago, Ill.—A case having interior and exterior threads of different pitch, a diaphragm seat with thread adapted to fit said interior threads, and an inclosing cap adapted to fit said exterior thread.

549,874 Electric speed regulator; C. W. Larson, Schenectady, N. Y.

549,876 Electric motor; R. Lundell, Brooklyn, N. Y.

549,886 Electric meter; R. O. Hood, Danvers, Mass. — Comprises an electric motor, a device for reversing the direction of movement of the movable part of said motor after it has reached a definite velocity, and a recording mechanism.

PATENTS.

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REFERENCES: "Electrical Review," New York; Paul Cromlein, Teller Lincoln National Bank, Washington, D. C.; Judge Geo. D. Parker, Berkley, Va.; Second National Bank, Washington, D. C.; E. K. Leech, U. S. Mint, Philadelphia, Pa.; W. F. Newell, Manager and Secretary Water Works, Olympia, Oregon.

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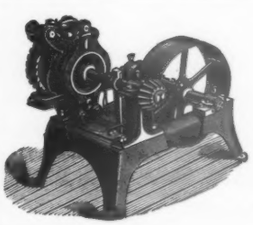

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